



The UNIVERSITY of NORTH CAROLINA at
CHARLOTTE



2009-2010 | GRADUATE CATALOG

Phone Numbers and Address

If, after reading this *Catalog*, you have further questions or specific inquiries about the programs of, or admission to, The University of North Carolina at Charlotte, please look below to find the proper office to contact. Address correspondence to any of the offices in care of:

The University of North Carolina at Charlotte
Attn: *Department or College*
9201 University City Boulevard
Charlotte, NC 28223-0001

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Campus Operator/Switchboard..... 704-687-2000

Academic Affairs 704-687-5717

Academic Services 704-687-7227

Admissions

Graduate..... 704-687-5503

Undergraduate..... 704-687-2213

International 704-687-3366

Summer Programs 704-687-4481

Adult Students & Evening Services..... 704-687-2596

Advising Center 704-687-7717

Athletics..... 704-687-4937

Bookstore..... 704-687-4584

Colleges

Arts + Architecture 704-687-4841

Business 704-687-7577

Computing & Informatics..... 704-687-8560

Education..... 704-687-8722

Engineering..... 704-687-8244

Health & Human Services..... 704-687-7917

Liberal Arts & Sciences..... 704-687-0088

Continuing Education 704-687-8900

Counseling Center 704-687-2105

Dean of Students..... 704-687-2375

Dining Services 704-687-2492

Disability Services 704-687-4355

Distance Education 704-687-3008

Financial Aid..... 704-687-2461

Graduate School..... 704-687-5503

Health Center 704-687-7400

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International Programs..... 704-687-7755

Library

Information Desk..... 704-687-2030

Circulation 704-687-2392

Reference..... 704-687-2241

Parking 704-687-4285

Recreational Services 704-687-2564

Registrar..... 704-687-5505

Student Accounts 704-687-2215

Student Activities 704-687-2521

Transcripts 704-687-5544

EMERGENCY NUMBERS

Campus Police -- Emergency..... 704-687-2200 or 911

Non-Emergency Calls..... 704-687-2282

Inclement Weather Hotline 704-687-2877

Acknowledgements

This Catalog was prepared and published by the Office of Academic Affairs in May 2009. Its goal is to provide a comprehensive, accurate, and useful catalog, which fully describes the academic programs, policies, regulations, and requirements of the University.

Although the publisher of this Catalog has made every reasonable effort to attain factual accuracy herein, no responsibility is assumed for editorial, clerical or printing errors, or errors occasioned by mistakes. The publisher has attempted to present information that, at the time of preparation for printing, most accurately describes the course offerings, faculty listings, policies, procedures, regulations, and requirements of the University. However, it does not establish contractual relations. The University reserves the right to alter or change any statement contained herein without prior notice.

We request that omissions and inaccuracies be brought to the attention of the Editor, as well as any suggestions and comments on the presentation.

Catalog Editor

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Graduation Rate Disclosure Statement. Our data shows that 56% of the full-time new freshmen who entered UNC Charlotte in Fall 2001 have received a baccalaureate from this institution or another UNC institution as of Fall 2007. In addition, another 6% were enrolled at this or another UNC institution in pursuit of their baccalaureate degree as of Fall 2007. This information is provided pursuant to requirements of the Student-Right-to-Know and Campus Security Act of 1990.



UNC CHARLOTTE

THE UNIVERSITY OF
NORTH CAROLINA AT CHARLOTTE

Graduate Catalog
2009-2010
Vol. VI

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The University of North Carolina at Charlotte is committed to equality of educational opportunity and does not discriminate against applicants, students, or employees based on race, color, national origin, religion, sex, sexual orientation, age, or disability. In keeping with this commitment, UNC Charlotte actively seeks to promote diversity in its educational environment through its recruitment, enrollment, and hiring practices.



Dear Students,

Welcome to UNC Charlotte, home of the Niner Nation. Whether you are here to pursue an undergraduate or graduate degree, the University of North Carolina at Charlotte is committed to providing you with the resources and support necessary to complete your educational journey. The expertise of our dedicated teaching and research faculty, support of our staff, and the many services offered will help you meet your personal and professional goals.

You join UNC Charlotte at an exciting point in its evolution. During your time here, the University will strengthen its presence in Center City Charlotte. Construction of our Center City Building reinforces the University's mission to be the state's urban research institution, committed to the cultural, economic, educational, environmental, health and social needs of the greater Charlotte region. Living and working in a diverse metropolitan region affords you special opportunities for study, research and personal growth.

I encourage you to become actively engaged in the life of the University. Beyond UNC Charlotte's exceptional educational experience, there are many ways for you to become engaged on campus and in the community – student activities, leadership and volunteer opportunities, Greek organizations, and intramural sports and athletics.

So, with all that awaits, get ready for an exhilarating time in your life. Go Niners!

Cordially,

Philip L. Dubois
Chancellor



We are pleased you have chosen UNC Charlotte for your graduate studies.

Our University is constantly changing, and you are a part of that change. The reputation of any great school is based in large part on the success of its students, and we are dedicated to supporting yours. Our distinguished graduate faculty are here to provide you with a quality education that will open doors for you. If we do our job right, your education will be intellectually challenging for you. If you do your job right, these years at UNC Charlotte will lay the groundwork for an exciting and satisfying future.

Our graduate studies programs continue to expand with every passing year. As we continue to grow, we look forward to your continuing to grow with us as a person, scholar, and future alumnus/alumna.

I wish you the best of luck in your studies.

Sincerely,

Joan F. Lorden
Provost and Vice Chancellor for Academic Affairs



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Academic Calendar

2009-2010

FALL 2009

Aug 17	Academic year begins
Aug 24	First day of instruction
Sep 2	Last day to file Application for Candidacy with Graduate School for December 2009 graduation
Sep 5	No Saturday classes
Sep 7	HOLIDAY: Labor Day
Oct 12-13	Student recess
Oct 23	Last day to submit Doctoral Dissertation with Graduate School for December 2009 Graduation
Nov 9	Registration for Spring 2010 begins
Nov 20	Last day to submit Master's Thesis with Graduate School for December 2009 Graduation
Nov 25-28	HOLIDAY: Thanksgiving
Dec 9	Last day of instruction
Dec 10	Reading day
Dec 11-18	Final examinations*
Dec 19	Fall Commencement

SPRING 2010

Jan 11	First day of instruction
Jan 18	HOLIDAY: M.L. King, Jr. Day
Jan 21	Last day to file Application for Candidacy with Graduate School for May 2010 graduation
Mar 8-13	Spring Break
Mar 19	Last day to submit Doctoral Dissertation with Graduate School for May 2010 Graduation
Mar 29	Registration for Summer 2010 and Fall 2010 begins
Apr 2-3	Spring Recess
Apr 16	Last day to submit Master's Thesis with Graduate School for May 2010 Graduation
May 1	Final exams for Saturday classes
May 4	Last day of instruction
May 5	Reading day
May 6-7, 10-13	Final examinations*
May 14	Ceremony Day
May 15	Spring Commencement
May 16	Academic year ends

SUMMER 2010

May 24-Jun 30	First Summer Term
May 31	HOLIDAY: Memorial Day
Jul 6-Aug 11	Second Summer Term
May 24-Aug 11	Extended Summer Term
Jul 1-5	No classes
Jul 5	HOLIDAY: Independence Day

*Common Examinations held on the first day of exams.

Please note: All dates are subject to change. A complete list of dates and deadlines is available online from the Office of the Registrar at www.registrar.uncc.edu/calendars/calendar.asp. Please check this site for the most current information.

AUGUST 2009							SEPTEMBER 2009						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
						1			1	2	3	4	5
2	3	4	5	6	7	8	6	7	8	9	10	11	12
9	10	11	12	13	14	15	13	14	15	16	17	18	19
16	17	18	19	20	21	22	20	21	22	23	24	25	26
23	24	25	26	27	28	29	27	28	29	30			
30	31												

OCTOBER 2009							NOVEMBER 2009						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
				1	2	3	1	2	3	4	5	6	7
4	5	6	7	8	9	10	8	9	10	11	12	13	14
11	12	13	14	15	16	17	15	16	17	18	19	20	21
18	19	20	21	22	23	24	22	23	24	25	26	27	28
25	26	27	28	29	30	31	29	30					

DECEMBER 2009							JANUARY 2010						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
		1	2	3	4	5						1	2
6	7	8	9	10	11	12	3	4	5	6	7	8	9
13	14	15	16	17	18	19	10	11	12	13	14	15	16
20	21	22	23	24	25	26	17	18	19	20	21	22	23
27	28	29	30	31			24	25	26	27	28	29	30
							31						

FEBRUARY 2010							MARCH 2010						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
	1	2	3	4	5	6		1	2	3	4	5	6
7	8	9	10	11	12	13	7	8	9	10	11	12	13
14	15	16	17	18	19	20	14	15	16	17	18	19	20
21	22	23	24	25	26	27	21	22	23	24	25	26	27
28							28	29	30	31			

APRIL 2010							MAY 2010						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
				1	2	3							1
4	5	6	7	8	9	10	2	3	4	5	6	7	8
11	12	13	14	15	16	17	9	10	11	12	13	14	15
18	19	20	21	22	23	24	16	17	18	19	20	21	22
25	26	27	28	29	30		23	24	25	26	27	28	29
							30	31					

JUNE 2010							JULY 2010						
S	M	T	W	Th	F	S	S	M	T	W	Th	F	S
		1	2	3	4	5					1	2	3
6	7	8	9	10	11	12	4	5	6	7	8	9	10
13	14	15	16	17	18	19	11	12	13	14	15	16	17
20	21	22	23	24	25	26	18	19	20	21	22	23	24
27	28	29	30				25	26	27	28	29	30	31



Graduate Degree and Non-Degree Programs

COLLEGE AND PROGRAM	DEGREE		
	<i>Certificate</i>	<i>Master's</i>	<i>Doctorate</i>
<i>College of Arts + Architecture</i>			
Architecture		MArch	
Urban Design		MUD	
<i>Belk College of Business</i>			
Accountancy		MAcc	
Business Administration		MBA	PhD
Business Administration: Finance			PhD
Economics		MS	
Economics: Finance		MS	
Mathematical Finance		MS	
MBA in Sports Marketing and Management		MBAS	
MBA Plus	Post-Master's		
Organizational Science (<i>interdisciplinary</i>)			PhD
Real Estate Finance and Development	Post-Master's		
<i>College of Computing and Informatics</i>			
Advanced Databases & Knowledge Discovery	Graduate		
Bioinformatics		MS	
Computer Science		MS	
Game Design and Development	Graduate		
Information Security and Privacy	Graduate		
Information Technology		MS	PhD
Management of Information Technology	Graduate		
<i>College of Education</i>			
Academically & Intellectually Gifted	Graduate		
Art Education		MAT	
Child & Family Development: Early Intervention	Graduate		
Child & Family Studies		MEd	

4 Degree Programs

COLLEGE AND PROGRAM	DEGREE		
	<i>Certificate</i>	<i>Master's</i>	<i>Doctorate</i>
Counseling			PhD
Counseling-Community		MA	
Counseling-School		MA	
Curriculum & Instruction			PhD
Curriculum & Supervision	Post-Master's	MEd	
Dance Education		MAT	
Educational Leadership			EdD
Elementary Education		MEd, MAT	
Foreign Language Education		MAT	
Instructional Systems Technology	Graduate	MEd	
Middle Grades Education			
English/Language Arts		MAT	
English		MEd	
Mathematics		MAT	
Science		MEd, MAT	
Social Studies		MED, MAT	
Music Education		MAT	
Play Therapy	Graduate		
Reading, Language & Literacy		MEd	
School Administration	Post-Master's	MSAD	
School Counseling	Post-Master's		
Secondary Education			
Biology		MAT, MEd	
Chemistry		MAT, MEd	
Comprehensive Science		MAT	
Earth Science		MAT, MEd	
English		MAT	
History/Social Studies		MAT, MEd	
Mathematics		MAT	
Physics		MAT, MEd	
Social Studies		MEd	
Special Education			PhD
Academically Gifted		MEd	
Adapted Curriculum		MAT, MEd	
General Curriculum		MAT, MEd	
Substance Abuse Counseling	Graduate		
Teaching	Graduate		
Teaching English as a Second Language	Graduate	MAT, MEd	
Theatre Education	Graduate	MAT	
<i>The William States Lee College of Engineering</i>			
<i>Engineering</i>			
Engineering, General		MSE, ME	
Civil Engineering		MSCE	
Electrical Engineering		MSEE	PhD
Engineering Management		MS	
Infrastructure and Environmental Systems			PhD
Mechanical Engineering		MSME	PhD

COLLEGE AND PROGRAM	DEGREE		
	<u>Certificate</u>	<u>Master's</u>	<u>Doctorate</u>
<i>College of Health and Human Services</i>			
Clinical Exercise Physiology		MS	
Community Health Promotion	Graduate		
Health Administration		MHAD	
Health Services Research			PhD
Public Health		MSPH	
Social Work		MSW	
School of Nursing			
Nurse Anesthesia	Post-Master's	MSN	
Nursing			
Advanced Clinical Adult Nurse Practitioner	Post-Master's	MSN	
Advanced Clinical Family Nurse Practitioner	Post-Master's	MSN	
Nurse Administrator	Graduate		
Nurse Educator	Graduate		
Systems/Populations: Nurse Practitioner		MSN	
Systems/Populations: Community Public Health Nursing		MSN	
Systems/Populations: Nurse Educator		MSN	
<i>College of Liberal Arts and Sciences</i>			
Anthropology		MA	
Applied Ethics	Graduate		
Applied Mathematics		MS	PhD
Applied Physics		MS	
Biology		MA, MS	PhD
Chemistry		MS	
Cognitive Science	Graduate		
Communication Studies	Graduate	MA	
Criminal Justice		MS	
Earth Science		MS	
Emergency Management	Graduate		
English		MA	
English Education		MA	
Ethics & Applied Philosophy		MA	
Gender, Sexuality, & Women's Studies	Graduate		
Geography		MA	PhD
Geography & Urban Regional Analysis			PhD
Gerontology	Graduate	MA	
Health Psychology			PhD
History		MA	
Latin American Studies		MA	
Liberal Studies		MA	
Mathematics		MS	
Mathematics Education		MA	
Nanoscale Science			PhD
Nonprofit Management	Graduate		
Optical Science & Engineering		MS	PhD
Organizational Science			PhD
Philosophy			
Psychology-Clinical & Community		MA	
Psychology-Industrial & Organizational		MA	
Public Administration		MPAD	

6 Degree Programs

COLLEGE AND PROGRAM	DEGREE		
	<u>Certificate</u>	<u>Master's</u>	<u>Doctorate</u>
Public Policy Studies			PhD
Religious Studies		MA	
Sociology		MA	
Spanish		MA	
Technical/Professional Writing	Graduate		
Translating/Translation Studies (Spanish)	Graduate		



The University

www.northcarolina.edu
www.unc.edu

THE UNIVERSITY OF NORTH CAROLINA

In North Carolina, all the public educational institutions that grant baccalaureate degrees are part of the University of North Carolina. The University of North Carolina has a rich heritage of academic excellence. Chartered in 1789 by the NC General Assembly, UNC was the first public university in the United States and the only one to graduate students in the eighteenth century. The first class was admitted in Chapel Hill in 1795. For the next 136 years, the only campus of the University of North Carolina was at Chapel Hill. Today, UNC is a multi-campus university system comprised of all sixteen of North Carolina's public institutions that grant baccalaureate degrees, as well as the NC School of Science and Mathematics, the nation's first public residential high school for gifted students.

In 1877, the N.C. General Assembly began sponsoring additional institutions of higher education, diverse in origin and purpose. Five were historically black institutions, and another was founded to educate American Indians. Several were created to prepare teachers for the public schools. Others were established with a technological emphasis, and one as a training school for performing artists.

In 1931, the N.C. General Assembly redefined the University of North Carolina to include three state-supported institutions: The Campus at Chapel Hill (now the University of North Carolina at Chapel Hill), North Carolina State College (now North Carolina State University at Raleigh), and Woman's College (now the University of North Carolina at Greensboro). The new multi-campus University operated with one board of trustees and one president. By 1969, three additional campuses had joined the University through legislative

action: the University of North Carolina at Charlotte, the University of North Carolina at Asheville, and the University of North Carolina at Wilmington.

In 1971, the General Assembly passed legislation bringing into the University of North Carolina the state's ten remaining public senior institutions, each of which had until then been legally separate: Appalachian State University, East Carolina University, Elizabeth City State University, Fayetteville State University, North Carolina Agricultural and Technical State University, North Carolina Central University, the North Carolina School of the Arts, Pembroke State University, Western Carolina University, and Winston-Salem State University. In 1985, the North Carolina School of Science and Mathematics, a residential high school for gifted students, was declared an affiliated school of the University.

The UNC Board of Governors is the policy-making body legally charged with "the general determination, control, supervision, management, and governance of all affairs of the constituent institutions." It elects the president, who administers the University. The 32 voting members of the Board of Governors are elected by the General Assembly for four-year terms. Former board chairmen and board members who are former governors of North Carolina may continue to serve limited periods as non-voting members emeriti. The president of the UNC Association of Student Governments, or that student's designee, is also a non-voting member.

Each of the seventeen constituent institutions is headed by a chancellor, who is chosen by the Board of Governors on the president's nomination and is responsible to the president. Each institution has a board of trustees, consisting of eight members elected by the Board of Governors, four appointed by the governor, and the president of the Student Government Association, who serves ex-officio. (The NC School of the Arts and the NC

School of Science and Mathematics have additional members.) Each board of trustees holds extensive powers over academic and other operations of its institution on delegation from the Board of Governors.

THE UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

UNC Charlotte's history began in 1946 when the Charlotte Center was established for returning World War II veterans. Three years later, Charlotte citizens and an inspired mathematics teacher named Bonnie Cone transformed the Center into Charlotte College, which offered a two-year curriculum. By 1961, the college outgrew its space in a high school building near the city center and moved to new buildings on a 1,000-acre campus at the northern end of the county. In 1963, Charlotte College was made a senior college, and in 1965, it became the fourth campus of The University of North Carolina.

UNC Charlotte recognizes a special responsibility to build the intellectual capital of the community. In order to meet the growing need for higher education in the Charlotte region and in the state, the University has continued to expand both degree programs and non-degree offerings. In 1969, the University began offering programs leading to Master's degrees, and in 1992, was authorized to offer programs leading to doctoral degrees. The first Ph.D. was awarded in mechanical engineering in 1997. Today, UNC Charlotte serves 23,300 students in 91 baccalaureate, 63 master's, and 18 doctoral programs in seven colleges and a university-wide graduate school.

Since its inception, UNC Charlotte has been committed to serving the region through not only its academic programs, but through research and service programs. In 2008, UNC Charlotte was designated a Community Engaged Campus by the Carnegie Foundation. The size and distinction of our research programs reflects the nationally competitive faculty. Recruited from across the world, they engage in both basic and applied research. Scholarly inquiry informs graduate and undergraduate instruction, and takes advantage of the University's location in a diverse and dynamic metropolitan region. Centers and institutes have been formed to address important interdisciplinary problems and to make the resources of the University accessible to stakeholders in the community.

With a broad institutional commitment to liberal education as the foundation for constructive citizenship, professional practice, and lifelong learning, UNC Charlotte is prepared to focus interdisciplinary resources to

address seven broad areas of concern to the Charlotte region: 1) Liberal Education; 2) Business and Finance; 3) Urban and Regional Development; 4) Children, Families, and Schools; 5) Health Care and Health Policy; 6) International Understanding and Involvement; 7) Arts and Culture; and 8) Applied Sciences and Technologies.

The University is committed to excellence through informed and effective teaching in all academic programs and emphasizes undergraduate instruction as the foundation of lifelong learning and advanced formal education. The students selected for admission have demonstrated a willingness to learn, a capacity to benefit from a broad array of intellectual resources, and the potential to participate in the opportunities offered by the changing global society. University programs are open to all qualified students without regard to race, color, national origin, gender, age, religious belief, sexual orientation, or disability. Participation by students from other states and nations is welcomed.

The campus environment encourages the active involvement of students in their personal and intellectual development, including opportunities to learn leadership skills. The policies and practices of the University are designed to graduate students with the breadth and depth of knowledge and the intellectual and professional skills that prepare them for a productive life in an ever-changing world. Through the University experience, UNC Charlotte students will:

- Develop strong ties and commitment to the University and its mission and vision
- Gain a realistic understanding of their personal potential
- Further their commitment to responsible citizenship and leadership
- Develop fundamental skills of inquiry in writing, mathematical and logical reasoning, information literacy and technology, and the sciences
- Gain an understanding and appreciation of the themes of liberal education for private and public life in the areas of arts and society, the western tradition, global understanding, and ethical issues and cultural critique
- Develop oral and written communication skills
- Develop the ability to engage in reasoned debate about pressing moral concerns and to resolve them in an ethically sound and responsible manner

THE COLLEGES

College of Arts + Architecture

Recently reorganized, the College includes the School of Architecture and the Departments of Art and Art History,

Dance, Music, and Theatre. The College also offers a variety of master's programs.

The Belk College of Business

One of the largest business programs in the Carolinas with 2,500 undergraduate students, 500 graduate students, and 87 faculty members. It is one of only three colleges in the state to offer bachelor's, master's, and a doctoral degree in business administration. The College also offers an innovative master's in sports management and marketing that takes advantage of Charlotte's professional athletic teams and its location in the heart of the motorsports industry.

College of Computing and Informatics

Includes Computer Science (design and implement software, devise new ways to use computers, and solving computing problems), Software and Information Systems (developing software and information systems, user-system interactions), and Bioinformatics and Genomics.

College of Education

It has almost 3,000 undergraduate and graduate students. Its academic departments include the Departments of Counseling; Educational Leadership; Middle, Secondary, and K-12 Education; Reading and Elementary Education; and Special Education and Child Development.

The William States Lee College of Engineering

Includes the Departments of Civil and Environmental Engineering; Electrical and Computer Engineering, Mechanical Engineering and Engineering Science, and Engineering Technology, as well as a program in Systems Engineering and Engineering Management. The college is home to world-class graduate programs in many fields including precision metrology and motorsports engineering.

College of Health and Human Services

Home to bachelor's degrees in Athletic Training, Exercise Science, Nursing, Public Health Sciences, and Social Work, as well as several master's degree programs and a doctoral program in Health Services Research.

College of Liberal Arts and Sciences

the oldest and largest college in the University. It serves half the undergraduate majors with a host of programs in the humanities, physical sciences, and social sciences.

UNIVERSITY STRUCTURE

UNC Charlotte is organized into five administrative divisions: Academic Affairs, Business Affairs, Development and Alumni Affairs, Student Affairs, and University

Relations and Community Affairs. These divisions, as well as Intercollegiate Athletics, Legal Affairs, and Internal Audit, all report to the Chancellor.

The Division of Academic Affairs includes Academic Services; Charlotte Research Institute; Enrollment Management; Institute for Social Capital; Information and Technology Services; International Programs; Library; Metropolitan Studies and Extended Academic Programs; Research and Federal Relations; The Graduate School; University College; and seven discipline-based colleges: the Colleges of Arts + Architecture, Business, Computing & Informatics, Education, Engineering, Health & Human Services, and Liberal Arts & Sciences. The colleges offer 91 bachelors, 63 master's, and 18 doctoral degree programs.

The Division of Business Affairs includes Business Services; Facilities Management; Financial Services; Human Resources; Risk Management, Safety, and Security; and Systems Development.

The Division of Development and Alumni Affairs includes the Office of Alumni Affairs and the Office of University Development. Today, UNC Charlotte boasts more than 75,000 living alumni and adds 4,500 to 5,000 new alumni each year.

The Division of Student Affairs includes departments and services which assist students through every aspect of their education, as well as providing social opportunities. Included are offices and services such as the Counseling Center, Dean of Students, Housing and Residence Life, Intramural and Recreational Services, Religious and Spiritual Life, Student Activities, Student Health Center, and the Student Union.

The Division of University Relations and Community Affairs includes Broadcast Communications, Public Relations, and Marketing, which serve as UNC Charlotte's primary contact with members of the news media and external audiences. They are responsible for communicating information that promotes the people, programs, news, and events of UNC Charlotte. Marketing is also responsible for implementing an integrated communications and marketing plan for the University.

EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION

The University of North Carolina at Charlotte recognizes a moral, economic, and legal responsibility to ensure equal employment opportunity for all persons, regardless of race, color, religion, gender (except when gender is a bona fide occupational qualification), sexual orientation, age,

national origin, physical or mental disability (except when making accommodations for physical or mental disabilities would impose undue hardship on the conduct of University business), or veteran status. This policy is a fundamental necessity for the continued growth and development of this University. Nondiscriminatory consideration shall be afforded applicants and employees in all employment actions including recruiting, hiring, training, promotion, placement, transfer, layoff, leave of absence, and termination. All personnel actions pertaining to either academic or nonacademic positions to include such matters as compensation, benefits, transfers, layoffs, return from layoffs, University-sponsored training, education, tuition assistance, and social and recreational programs shall be administered according to the same principles of equal opportunity. Promotion and advancement decisions shall be made in accordance with the principles of equal opportunity, and the University shall, as a general policy, attempt to fill existing position vacancies from qualified persons already employed by the University. Outside applicants may be considered concurrently at the discretion of the selecting official. The University has established reporting and monitoring systems to ensure adherence to this policy of nondiscrimination.

Affirmative Action

Our philosophy concerning equal employment opportunity is affirmed and promoted in the University's Affirmative Action Plan. To facilitate UNC Charlotte's affirmative action efforts on behalf of disabled workers, veterans (including veterans of the Vietnam Era), individuals who qualify and wish to benefit from the Affirmative Action Plan are invited and encouraged to identify themselves. This information is provided voluntarily, and refusal of employees to identify themselves as veterans or disabled persons will not subject them to discharge or disciplinary action. Unless otherwise required by law, the information obtained will be kept confidential in the manner required by law, except that supervisors and managers may be informed about restrictions on the work or duties of disabled persons and about necessary accommodations.

Discriminatory Personal Conduct

The University seeks to promote a fair, humane, and respectful environment for its faculty, staff, and students. To that end, University policy explicitly prohibits sexual harassment, racial harassment, and all other personal conduct which inappropriately asserts that sex, race, color, ethnicity, sexual orientation, religion, veteran status, disability, age, or ancestry are relevant to consideration of individual worth or individual performance. The same policies provide procedures for the informal or formal resolution of instances where such behavior is suspected or alleged. The policies have received wide distribution and

are available for inspection in all administrative offices on campus as well as online at www.legal.uncc.edu/policies/nondiscrim.html

ACCREDITATION

UNC Charlotte is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award baccalaureate, masters, and doctorate degrees. Contact the Commission on Colleges at 1866 Southern Lane, Decatur, Georgia 30033-4097 or call 404-679-4500 for questions about the accreditation of UNC Charlotte.

The Bachelor of Architecture and Master of Architecture "first professional degree" programs are accredited by the National Architectural Accrediting Board (NAAB). The Department of Chemistry is on the approval list of the American Chemical Society. The Master of Public Administration program is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA). The Bachelor of Social Work and Master of Social Work programs are accredited by the Council on Social Work Education (CSWE). The programs in business and accounting are accredited by AACSB International - The Association to Advance Collegiate Schools of Business. The University's professional education programs for BK-12 teachers, counselors, and administrators are approved by the North Carolina Department of Public Instruction (NCDPI) and accredited by the National Council for Accreditation of Teacher Education (NCATE). The School Counseling and Agency (Community) Counseling programs in Counselor Education are accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). The civil, computer, electrical, and mechanical engineering programs are accredited by the Engineering Accreditation Commission of ABET; and the civil, electrical, and mechanical engineering technology programs are accredited by the Technology Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone: (410) 347-7700. The Nursing programs are accredited by the Commission on Collegiate Nursing Education (CCNE) and the BSN program is approved by the North Carolina Board of Nursing. The Nursing Anesthesia program is accredited by the Council on Accreditation of Nurse Anesthesia Educational Programs (COA). The Bachelor of Athletic Training program is accredited by the Commission on Accreditation of Athletic Training Education (CAATE) through October 2009 and anticipates receiving continued re-accreditation through 2014. Both the Bachelor of Science in Exercise Science program and the Master of Science in Clinical Exercise Physiology are actively pursuing accreditation by the Commission on

Accreditation of Allied Health Education Programs (CAAHEP). The Master of Health Administration program is accredited by the Commission on Accreditation of Healthcare Management Education (CAHME). The Master of Science in Public Health program was recently reviewed for initial accreditation by the Council on Education for Public Health (CEPH).

The University is a member of the Council of Graduate Schools, the Conference of Southern Graduate Schools, and The North Carolina Association of Colleges and Universities.

THE CAMPUS

The University of North Carolina at Charlotte is the largest institution of higher education in the Charlotte region and is a genuine urban university. The main campus is in University City, one of the fastest growing areas of the Charlotte region, located off WT Harris Boulevard on NC 49 near its intersection with US 29, and only eight miles from the interchange of Interstates 85 and 77. Campus facilities are comprised of contemporary buildings, including many new ones constructed in the past ten years and more on the way. In addition to classrooms and well-equipped laboratories, the University offers arts and athletic facilities, cafeterias, and residence accommodations. The campus is designed for the pedestrian, and facilities are generally accessible to students with disabilities.

UNC Charlotte Uptown

The University also has a substantial presence uptown, as it offers select upper-division undergraduate and graduate courses and a variety of continuing personal and professional development programs at its UNC Charlotte Uptown location. Classes are scheduled for the convenience of persons employed in or living near the central business core of the city. UNC Charlotte Uptown is located at 220 North Tryon Street, on the third floor of the Mint Museum of Craft + Design. Additionally, UNC Charlotte has a major presence in South End at its Charlotte Community Design Studio.

Looking forward, the University plans to build a major new Center City Classroom Building in Uptown Charlotte on the corner of Brevard and Ninth streets, in the heart of Charlotte's bustling financial district, where students and faculty members will be able to rub shoulders with bankers, architects, technologists, and other professionals. Twelve stories high, the facility will have 143,000 total square feet for offices and academic programs in graduate, professional, and continuing education. It will increase UNC Charlotte's presence in Center City by 10 times its current space. The undertaking is the first major urban

facility in the University of North Carolina system. The Center City Building will be home to the Belk College of Business graduate programs, including the MBA, as well as the MBA in Sports Marketing and Management. Students also will study graduate-level programs in engineering management, health administration, information technology, public administration, urban design, organizational science, public history, liberal studies, and other fields. The building will also provide space for the Office of Continuing Education, and it will house the Design + Society Research Center. A 300-seat hall can be used for lectures, recitals and conferences. The Center City Building is scheduled to open in 2010.

THE 49ERS

The nickname, the 49ers, was chosen in recognition of the importance of the year 1949 in the history of the University. UNC Charlotte, which began as an off-campus center of the University of North Carolina at Chapel Hill, would have died in 1949 had Bonnie Cone and her supporters not convinced the N.C. Legislature that Charlotte needed a permanent college. Charlotte College was established that year. Additionally, the campus is located on N.C. Highway 49, and Charlotte has a rich gold mining history -- the term "49ers" symbolizes gold mining. A bronze statue of the 49ers Gold Miner sits in front of the Reese Administration building on campus. The statue recalls the region's history as a gold mining center and symbolizes the pioneering spirit and determination that has led to UNC Charlotte's dramatic growth.

UNIVERSITY LOGO

UNC Charlotte's logo has become one of the Charlotte region's most distinctive insignia. It symbolizes the



University's link to the UNC system, to the Charlotte metropolitan region, and to the discipline of learning. The logo is suggestive of a "crown," reminiscent of Queen Charlotte of England, for

whom the city of Charlotte is named. The "crown" can also be interpreted as a lamp of learning, a burning brush, an open book, the flowering of a plant or an individual, or a graduate in cap and gown.

ALMA MATER

UNC Charlotte's Alma Mater has deep roots in the institution's history. It was part of an "Academic Festival

March" composed for UNC Charlotte by James Helme Sutcliffe, a Charlotte composer and music critic who lived in Germany at the time. Dr. Loy Witherspoon, professor of religious studies, commissioned the March in 1965 when he learned that Charlotte College would become a campus of The University of North Carolina. The March was first performed in 1967 at the installation of Dean W. Colvard as UNC Charlotte's first chancellor. Afterwards, it was performed as a recessional at every Commencement during Dean W. Colvard's tenure as chancellor. When UNC Charlotte founder Bonnie Cone heard the March, she said, "I can hear an alma mater in it," referring to a hymn-like refrain. Dr. Robert Rieke, a professor of history, also heard an alma mater in it.

On a 1990 trip to Germany, Rieke visited Sutcliffe, picked up a recording of the March, and began writing words to fit the final refrain. On Christmas Eve 1991, he sent Bonnie Cone the words and music as a Christmas present to her and to the University, from which he had retired a year earlier. Chancellor James H. Woodward approved the composition as the University's Alma Mater in April 1992. It was sung for the first time at the following May Commencement and has been performed at every Commencement since.



The Graduate School

www.uncc.edu/gradmiss

*Associate Provost for Graduate Programs
and Dean of the Graduate School: Thomas L. Reynolds*
Senior Associate Dean of the Graduate School: Kent E. Curran
Associate Dean of the Graduate School: Susan M. Sell
Associate Dean of the Graduate School: Johnna W. Watson
Assistant Dean of the Graduate School: Katherine Hall-Hertel
Assistant Dean of the Graduate School: Greet Provoost
Director of Development for the Graduate School: Kathy Larson

Dean, College of Arts + Architecture: Kenneth A. Lambla
Dean, Belk College of Business: Joseph Mazzola
Dean, College of Computing and Informatics: Yi Deng
Dean, College of Education: Mary Lynne Calhoun
Dean, The William States Lee College of Engineering: Robert E. Johnson
Dean, College of Health and Human Services: Karen Schmalzing
Dean, College of Liberal Arts and Sciences: Nancy A. Gutierrez

The University of North Carolina at Charlotte was established in 1965 by the North Carolina General Assembly, which transformed Charlotte College, with beginnings in 1946, into a campus of The University of North Carolina. The Graduate School was established in 1985 with the appointment of the first Dean of the Graduate School, although graduate degree programs had been offered since 1969. Today, more than 800 members of the Graduate Faculty and more than 4,500 graduate students participate in a broad array of graduate programs at the master's and doctoral levels and in graduate certificate programs.

The executive and administrative affairs of the Graduate School are carried out by the Associate Provost for Graduate Programs and Dean of the Graduate School, who acts in cooperation with the deans of the seven disciplinary colleges of Arts + Architecture, Business, Computing & Informatics, Education, Engineering, Health & Human Services, and Liberal Arts & Sciences.

The Graduate Council

The Graduate Council, whose voting members are elected by the Graduate Faculty, reviews, develops and makes recommendations concerning Graduate School policy. All curricular proposals and all criteria for membership on the Graduate Faculty come before the Graduate Council. In

addition, the Graduate Council serves in an advisory capacity to the Dean of the Graduate School.

The Graduate Faculty

In accordance with criteria developed by each graduate program or unit and approved by the Graduate Council, the Dean of the Graduate School appoints members of the Graduate Faculty for renewable terms. Members of the Graduate Faculty offer courses and seminars, mentor graduate students, and supervise research at an advanced level of scholarship.

The Graduate Directors and Coordinators

Each graduate program, and in some cases certain program areas within a discipline, has either a Graduate Director or Coordinator. This individual is a member of the Graduate Faculty and is responsible for coordinating various functions of the departmental graduate program. Directors and Coordinators assist students with understanding program requirements (along with the student's specific advisor) and can answer program specific questions such as transfer credit, prerequisites, program specific admission requirements, etc.

GRADUATE PROGRAMS

Doctoral and Master's Degree Programs

UNC Charlotte offers 18 doctoral and 62 master's degree programs. To be admitted to a degree program, an applicant must meet all the requirements for admission, be recommended for admission by the program in which he/she proposes to study and receive final approval for admission by the Graduate School. Acceptance into one graduate program does not guarantee acceptance into any other program. See the "Graduate Degree and Non-Degree Programs" section of this *Catalog* for a list of available programs.

Graduate Certificate Programs

Graduate certificate programs are mechanisms for students who wish to complete a coherent graduate program in a defined area. Students are admitted to a specific graduate certificate program and are advised by faculty in the unit offering the graduate certificate. Since the graduate certificate is not a degree, students may apply the credits earned in the certificate program toward a single degree that they pursue either concomitant with pursuing a graduate certificate or after the certificate has been awarded. *[Please note: time to degree limits do apply.]*

Post-Baccalaureate (Non-Degree) Program

Applicants seeking to take courses beyond the baccalaureate degree for license renewal, for transfer to another institution, as prerequisites for admission to a graduate degree program or for personal satisfaction may be admitted as post-baccalaureate/non-degree students. A post-baccalaureate student who is subsequently admitted to a graduate degree or certificate program may, with the recommendation of his/her advisor and the approval of the Graduate School, apply a **maximum** of six graduate credit hours acceptably completed in the post-baccalaureate status toward a degree.

Readmission – All Students

Post-baccalaureate/non-degree, graduate certificate, and degree-seeking students whose enrollment is interrupted will remain eligible to register for one calendar year without having to reapply for admission to the University if they are in good standing and have not exceeded the four, six or eight-year limit for their academic program of study. After an absence of more than 12 months, the student's matriculation will be closed and the student must apply for readmission; acceptance is subject to department, program, and Graduate School approval. Students whose enrollment is suspended or terminated for academic reasons should consult the description of the procedures outlined in the "Academic Standing" section of the *Catalog*.

Early-Entry to Graduate Programs

See "Registration" under the Degree Requirements and Academic Regulations section of this *Catalog* for details.

Dual Undergraduate & Graduate Registration

See "Registration" under the Degree Requirements and Academic Regulations section of this *Catalog* for details.

GRADUATE STUDENT LIFE

New Graduate Student Orientation

The Graduate School conducts several University-wide orientation programs for new graduate and post-baccalaureate students during the course of the year. Information about the dates and times of these programs can be found online at www.uncc.edu/gradmiss. Information on the fall semester programs is also sent, beginning in July, directly to new students admitted for the fall semester. All Graduate Teaching Assistants are **required** to attend a specific orientation program prior to the fall semester as part of their assistantship contract.

The orientation programs offer information about various University programs and services for graduate students; provide publications, including resources available to support graduate students academically and socially; various content workshops on issues relevant to graduate education and graduate student life; and provide opportunities for students to ask specific questions.

Many of the individual graduate programs conduct discipline-specific orientation programs for their new graduate students. Degree students should contact their major department for information on programs that may be available. In addition, the International Student/Scholar Office (ISSO) conducts orientation sessions specifically designed for international graduate students.

Student Involvement

Students at UNC Charlotte are encouraged to participate in co-curricular activities. UNC Charlotte acknowledges that graduate students have many, many priorities in their lives. However, as with so many other aspects of one's life, active involvement enhances the experience.

Graduate and Professional Student Government

The Graduate and Professional Student Government (GPSG) is the governing and primary organization for graduate students to present their needs to the University. The purpose of the Graduate and Professional Student Government (GPSG), according to the by-laws, is to serve as an appropriate voice on campus for graduate students, to meet the various needs of graduate students, and to

establish a liaison between graduate faculty, graduate students, and the University. All graduate students are members of the GPSG.

In the spring of 1998, the Graduate Student Association successfully petitioned the student body through a referendum on the spring student body elections. The results of this referendum provided a significant change in the student body constitution and provided for the Graduate and Professional Student Government to become a separate governing body and representative organization for graduate students. In outlining the reasons for this separation, the GPSG cited the need for a GPSG office and the graduate student share of student activity fees to support: departmental graduate student associations, graduate student travel to read papers at academic conferences, and developing a Graduate Student Research Forum.

During the 1998-1999 academic year, GPSG began functioning as its own governing body. In the 1999-2000 academic year, the recognition of current (and new) graduate student organizations and the funding of these groups, including the GPSG, became the responsibility of the Graduate and Professional Student Government. Since the inception of the GPSG in its current structure, the availability of student activity fees to graduate students directly have increased dramatically. With this new governing structure, the GPSG has been very successful in advocating for and supporting graduate student needs. An annual Research Fair competition was begun in the spring of 2001 to showcase and reward excellence in graduate student research across all disciplines. GPSG continues to be active in new graduate student orientation, encouraging and recognizing graduate student organizations and increasing the amount of student activity fee support for graduate students. Each graduate program has the opportunity to be represented on the GPSG senate.

The GPSG Office is located in the Cone University Center, Room 369I, 704-687-3231. More information can be found online at www.sco.uncc.edu/gpsg.

Graduate Student Organizations

There are a number of graduate student organizations directly associated with academic programs. These include:

- American Society for Precision Engineering
- Association of Biology Graduate Students (ABGS)
- Association of Chemistry Graduate Students
- Association of Graduate IT Students (AGITS)
- Association of Nanoscience Graduate Students
- Charlotte Healthcare Executive Student Organization
- Communication Studies Graduate Student Association (CSGSA)
- Educational Leadership Graduate Student Council (EDLEAD-GSC)
- English Graduate Student Association (EGSA)
- Gamma Theta Upsilon (Geography)
- Graduate Association of Model United Nations
- Graduate History Association
- Graduate Professional Student Government
- Graduate Public Health Association
- Graduate Public Policy Association
- Graduate Social Work Association
- Health Psychology Graduate Student Association
- Industrial/Organizational Psychology Graduate Association
- International Society for Optical Engineering (SPIE)
- Master of Architecture Student Society (MASS)
- Master of Public Administration Student Group (MPASG)
- Mathematics Graduate Student Association
- Mu Tau Beta (Counseling)
- Sigma Phi Omega (Gerontology)
- Sports MBA Association

Information on each group is available from the individual academic program department. Some groups have information available on the Student Organizations website at <http://studentorgs.uncc.edu>.

Please see additional information on the various programs, offices and services at UNC Charlotte in the “Student Resources and Services” section of this *Catalog*.

ADMISSION TO THE GRADUATE SCHOOL

Admissions Information

The University considers all applications without regard to race, color, sex, sexual orientation, national origin, disability, age or religion. All relevant factors are considered, with major emphasis being placed on the academic history of the applicant. The intent of the University is to offer admission to those applicants whose credentials indicate a strong likelihood of success in their selected curricula.

The University reserves the right to withhold or rescind the admission of an applicant who (1) fails to meet any of the requirements for admission at the time of matriculation or who (2) has failed to maintain satisfactory academic performance in their course of study. Additionally, meeting the minimum admission requirements does not guarantee admission to a graduate program and the University reserves the right to restrict enrollments when necessary because of budgetary or other constraints.

Application Materials

A separate application, processing fee, and statement of purpose must be submitted for **each** graduate program of study for which a student applies. Questions about the application process should be directed to one of the following:

Applicants Should Contact:

Office of Graduate Admissions
 UNC Charlotte
 9201 University City Boulevard
 Charlotte, NC 28223-0001
 Telephone: 704-687-5503
 Fax: 704-687-3279

Online at:

For U.S. Applicants
 E-mail: gradadm@uncc.edu
 Web : www.uncc.edu/gradmiss

For International Applicants

E-mail: intlgradadm@uncc.edu
 Web: www.intladm.uncc.edu

Application Deadlines

Students are encouraged to apply and to submit all supporting documents well in advance of the published priority deadlines. Some programs have **earlier deadlines** and may only admit students to a particular term. Please contact the department offering the program to which you are applying for specific deadline information and/or view the information online at www.uncc.edu/gradmiss. The Graduate School may alter the date for acceptance of applications without further notice in accordance with available resources and/or the enrollment limitation established by the North Carolina General Assembly or the University. Note that applications received after the Graduate School's priority deadlines may be processed on a space-available basis.

<u>Term of Entry:</u>	<u>Application and Supporting Documents Should Be Submitted By the Following Priority Deadlines:</u>
Fall	May 1
Spring	October 1
1 st & 2 nd Summer Session	April 1

Application Processing

Applicants must apply for admission online; instructions and the application are available online at www.uncc.edu/gradmiss/p_app_instructions.html. Applications of US Citizens, US Permanent Residents, Asylees and Refugees are processed as "domestic"

applications. Applications of students on, or intending to be on, temporary visa/status in the USA (i.e. F-1, H-1, H-4 etc) as well as Pending Permanent Residents are processed as "international applications." Applicants should follow application instructions accordingly.

Application Processing Fee

Submission of the online application for admission to graduate study requires online payment of a US \$55 application fee by credit card.

Application Status

Applicants will receive an online confirmation of successful submission of their application for admission to graduate study. Applicants can monitor the status of their applications within the online system (ApplyYourself) through which their application was submitted, utilizing the same username and pin number.

TYPES OF ADMISSION

(For Doctoral Degrees, Master's Degrees, and Graduate Certificates)

Full Standing

Applicants who meet the general requirements for admission to graduate study plus any additional requirements specified by the college or department of academic concentration for the degree sought will be admitted to full standing.

Provisional Standing

Applicants to graduate programs who have not yet completed their undergraduate degree will be provisionally admitted, pending the University's receipt of final transcripts (and/or diploma/degree certificates) indicating the award of the baccalaureate (bachelor's/undergraduate) degree. Students will have a maximum of one semester on provisional admission after which time a hold will be placed on their accounts to prevent registration for future terms. Failure to submit the proper credentials during the first semester of enrollment will result in a hold on registration for subsequent terms.

Deferment Policy

An applicant who is admitted to a graduate program of study who fails to enroll for the term to which he/she has been admitted is presumed to have withdrawn his/her application.

An application for admission is only valid for the program and term for which it was initially submitted. Applicants who wish to defer their admission must submit a new application, which includes updated data, and application fee. Supporting documents submitted with an earlier

application are maintained on file for one year from the original term of application. However, applicants on, or intending to be on, F-1 or J-1 visa status will be required to provide updated proof of legal status and financial resources.

Policy on Updating Applications

Applicants who do not submit their supporting documentation in time to be considered for admission to the requested term must submit a new application which includes updated data and application fee. Incomplete applications (including test score reports) are maintained on file for one year from the original term of application. Supporting credentials received without an application will be maintained on file in the Office of Graduate Admissions for one year.

Likewise, applications for persons (domestic or international) who are not admitted are maintained on file for one year. Students whose admission to UNC Charlotte was denied must reapply for admission to be considered for admission to a different term or program.

GENERAL APPLICATION REQUIREMENTS FOR ADMISSION

Doctoral Degree Programs

In order to be considered for admission to a doctoral program, an applicant must have a bachelor's degree (or its US equivalent) from a regionally accredited college or university. Some programs admit baccalaureate (bachelor's degree) students directly to the doctoral program, while others require applicants to have earned a master's degree.

To be admitted to a doctoral program after a master's program, an applicant should have earned an overall grade point average of at least 3.5 (on a 4.0 scale) in the master's degree program. To be admitted to a doctoral program after a bachelor's program, an applicant should have earned an overall GPA of at least 3.0 in the bachelor's degree program, including a 3.0 for the last four semesters of his/her bachelor's degree.

Applications generally consist of the items listed below, some of which are submitted online, some by mail by the applicant or by the issuing entity. Any materials submitted in support of an application for admission to graduate study become the property of the University and cannot be returned to the applicant.

- 1) The application form must be submitted online through the Graduate School's application system.

The online application system can be accessed via www.uncc.edu/gradmiss. Submission of the application form requires payment of a \$55 application fee which is paid online by credit card; the fee is neither deductible nor refundable.

- 2) A Statement of Purpose (essay) must be submitted online as part of the application submission process. Applicants must upload the Statement of Purpose into their application record. The Statement of Purpose describes the applicant's experience, objectives for undertaking graduate study and research interests, if known. *[Note: Some graduate programs request specific items to be included in the Statement of Purpose. Applicants should check the department's website or contact the department directly for further clarification on specific requirements related to the Statement of Purpose.]*
- 3) At least three letters of recommendation (evaluations) from persons familiar with the applicant's personal, academic and/or professional qualifications. The letters of recommendation may be submitted via the online application system or may be submitted in hard-copy along with other supplemental application items.
- 4) Official (officially certified) transcripts of all academic work attempted beyond high (secondary) school. Transcripts of each academic institution of higher education ever attended must be submitted; transfer credit posted on the records of other institutions is unacceptable and official transcripts of these credits must be supplied. One official (officially certified) transcript is required from each institution.
- 5) Official agency reports of satisfactory test scores as specified in the section on graduate programs in this *Catalog*. GRE/GMAT scores are reportable from ETS for a period of five years from the date of the exam. Likewise, the Graduate School accepts GRE/GMAT scores which are up to five years old as part of the application-for-admission process. GRE/GMAT scores older than five years old are therefore not acceptable since they cannot be officially reported. Likewise, MAT scores more than five years old are not accepted. For additional information regarding test score requirements, please see the "Test Information" section of this *Catalog*.
- 6) Official scores on the Test of English as a Foreign Language (TOEFL), the Michigan English Language Assessment Battery (MELAB) or the International English Language Testing System (IELTS), if English is not the applicant's native language and he or she has not earned a post-secondary degree from a U.S. institution. Required is either a minimum score of 83 on the Internet-based TOEFL, a minimum score of 220 on the computer-based TOEFL, a minimum score of 557 on the paper-based TOEFL, a minimum score of 78 percent on the MELAB, or a minimum overall band score of 6.5 on the IELTS. Applicants

who are citizens of, or who have received an associate's degree or higher in one of the following countries, are exempt from the English language proficiency requirement: Australia, British Caribbean and British West Indies, Canada (except Quebec), Ireland, Liberia, New Zealand, United Kingdom, and United States.

Notes:

- 1) *Applicants with records of high quality who do not fulfill these requirements should discuss with the graduate program coordinator or director other factors that may have a bearing on admission. Some programs have higher standards or additional admission requirements. Additionally, there may be prerequisites for certain doctoral programs. Students should consult the graduate program coordinator for the doctoral program to identify prerequisites. A separate application for admission is required for each graduate, post-baccalaureate, and certificate program of study at UNC Charlotte.*
- 2) *All applicants submitting transcripts and degree certificates from non-U.S. educational institutions should note that bachelor's degrees awarded by non-U.S. schools may or may not be considered equivalent to the U.S. bachelor's degree. Recipients of degrees that are not at least equivalent to a U.S. bachelor's degree may not be eligible for graduate study at UNC Charlotte.*
- 3) *International Students should see the "Additional Admission Requirements for International Applicants" section of this Catalog for additional requirements.*

Master's Degree Programs

The applicant must possess at least a bachelor's degree, or its US equivalent, from a regionally accredited college or university, and must have attained an overall grade point average of at least 2.75 (based on a 4.0 scale) on all of the applicant's previous work beyond high school. The average for the junior and senior years, or its equivalent, must be a 3.0 or better. If an applicant has earned or attempted a post-baccalaureate degree (i.e., a master's, doctoral, or other), grades in that program will also be taken into consideration.

Applications generally consist of the items listed below, some of which are submitted online, some by mail by the applicant or by the issuing entity. Any materials submitted in support of an application for admission to graduate study become the property of the University and cannot be returned to the applicant.

- 1) The application form must be submitted online through the Graduate School's application system. The online application system can be accessed via www.uncc.edu/gradmiss. Submission of the application form requires payment of a \$55 application fee which is paid online by credit card; the fee is neither deductible nor refundable. The

application form compiles relevant applicant-specific data necessary as part of the application-for-admission process.

- 2) A Statement of Purpose (essay) must be submitted online as part of the application submission process. Applicants must upload the Statement of Purpose into their application record. The Statement of Purpose describes the applicant's experience and objectives for undertaking graduate study. *[Note: Some graduate programs request specific items to be included in the Statement of Purpose. Applicants should check the department's website or contact the department directly for further clarification on specific requirements related to the Statement of Purpose.]*
- 3) At least three letters of recommendation (evaluations) from persons familiar with the applicant's personal, academic and/or professional qualifications. The letters of recommendation may be submitted via the online application system or may be submitted in hard-copy along with other supplemental application items.
- 4) Official (officially certified) transcripts of all academic work attempted beyond high (secondary) school. Transcripts of each academic institution of higher education ever attended must be submitted; transfer credit posted on the records of other institutions is unacceptable and official transcripts of these credits must be supplied. One official (officially certified) transcript is required from each institution
- 5) Official agency reports of satisfactory test scores as specified in the section on graduate programs in this *Catalog*. GRE/GMAT scores are reportable from ETS for a period of five years from the date of the exam. Likewise, the Graduate School accepts GRE/GMAT scores which are up to five years old as part of the application-for-admissions process. GRE/GMAT scores older than five years old are therefore not acceptable since the scores cannot be officially reported. Likewise, MAT scores more than five years old are not accepted. For additional information regarding test score requirements, please see the "Test Information" section of this *Catalog*.
- 6) Official scores on the Test of English as a Foreign Language (TOEFL), the Michigan English Language Assessment Battery (MELAB) or the International English Language Testing System (IELTS), if English is not the applicant's native language and he or she has not earned a post-secondary degree from a U.S. institution. Required is either a minimum score of 83 on the Internet-based TOEFL, a minimum score of 220 on the computer-based TOEFL, a minimum score of 557 on the paper-based TOEFL, a minimum score of 78 percent on the MELAB, or a minimum overall bandscore of 6.5 on the IELTS. Applicants who are citizens of, or who have received an associate's degree or higher in one of the following countries, are exempt from the English language

proficiency requirement: Australia, British Caribbean and British West Indies, Canada (except Quebec), Ireland, Liberia, New Zealand, United Kingdom, and United States.

Notes:

- 1) *Acceptance into each program must be approved by the department or college offering the program and by the Graduate School. Meeting minimum requirements for admission does not guarantee acceptance into a program. There may be prerequisites for certain master's programs. Students should consult the coordinator for the master's program to identify prerequisites. A separate application for admission is required for each graduate, post-baccalaureate, and certificate program of study at UNC Charlotte.*
- 2) *All applicants submitting transcripts and degree certificates from non-U.S. educational institutions should note that bachelor's degrees awarded by non-U.S. schools may or may not be considered equivalent to the U.S. bachelor's degree. Recipients of degrees that are not at least equivalent to a U.S. bachelor's degree may not be eligible for graduate study at UNC Charlotte.*
- 3) *International Students should see the "Additional Admission Requirements for International Applicants" section of this Catalog for additional requirements.*

Graduate Certificate Programs

The applicant must possess at least a bachelor's degree, or its equivalent, from a regionally accredited college or university and must have attained an overall grade point average of at least 2.75 (based on a 4.0 scale) on all previous work completed beyond high school (secondary school). The average for the junior and senior years must be a 3.0 or better. If the applicant has earned or attempted a post-baccalaureate degree (i.e., master's, doctoral, or other), grades in that program will also be taken into consideration.

Applications generally consist of the items listed below, some of which are submitted online, some by mail by the applicant or by the issuing entity. Any materials submitted in support of an application for admission to graduate study become the property of the University and cannot be returned to the applicant.

- 1) The application form must be submitted online through the Graduate School's application system. The online application system can be accessed via <http://www.uncc.edu/gradmiss>. Submission of the application form requires payment of a \$55 application fee which is paid online by credit card; the fee is neither deductible nor refundable. The application form compiles relevant applicant-specific data necessary as part of the application-for-admission process.

- 2) A Statement of Purpose (essay) must be submitted online as part of the application submission process. Applicants must upload the Statement of Purpose into their application record. The Statement of Purpose describes the applicant's experience and objectives for undertaking graduate study. *[Note: Some graduate programs request specific items to be included in the Statement of Purpose. Applicants should check the department's website or contact the department directly for further clarification on specific requirements related to the Statement of Purpose.]*
- 3) Official (officially certified) transcripts of all academic work attempted beyond high (secondary) school. Transcripts of each academic institution of higher education ever attended must be submitted; transfer credit posted on the records of other institutions is unacceptable and official transcripts of these credits must be supplied. One official (officially certified) transcript is required from each institution
- 4) Official scores on the Test of English as a Foreign Language (TOEFL), the Michigan English Language Assessment Battery (MELAB) or the International English Language Testing System (IELTS), if English is not the applicant's native language and he or she has not earned a post-secondary degree from a U.S. institution. Required is either a minimum score of 83 on the Internet-based TOEFL, a minimum score of 220 on the computer-based TOEFL, a minimum score of 557 on the paper-based TOEFL, a minimum score of 78 percent on the MELAB, or a minimum overall bandscore of 6.5 on the IELTS. Applicants who are citizens of, or who have received an associate's degree or higher in one of the following countries, are exempt from the English language proficiency requirement: Australia, British Caribbean and British West Indies, Canada (except Quebec), Ireland, Liberia, New Zealand, United Kingdom, and United States.

Some programs may also require:

- Standardized test scores such as GRE, GMAT or MAT.
- Additional admission requirements as specified in program descriptions available at the departments' websites.

Notes:

- 1) *There may be prerequisites for a graduate certificate program. Students should consult the coordinator for the graduate certificate program to identify prerequisites. Admission to a graduate certificate program does not ensure admission into a master's or doctoral degree program. A separate application for admission is required for each graduate-level program of study, whether master's, doctoral certificate or post-baccalaureate (non-degree) programs.*

- 2) *All applicants submitting transcripts and degree certificates from non-U.S. educational institutions should note that bachelor's degrees awarded by non-U.S. schools may or may not be considered equivalent to the U.S. bachelor's degree. Recipients of degrees that are not at least equivalent to a U.S. bachelor's degree may not be eligible for graduate study at UNC Charlotte.*
- 3) *International Students should see the "Additional Admission Requirements for International Applicants" section of this Catalog for additional requirements.*

Post-Baccalaureate (Non-Degree) Program

The applicant must possess a bachelor's degree, or its US equivalent, from a regionally accredited college or university.

Applications generally consist of the items listed below, to be submitted online. Application materials submitted in support of an application for admission to graduate study, including non-degree study, become the property of the University and cannot be returned to the applicant.

- 1) The application form must be submitted online through the Graduate School's application system. The online application system can be accessed via www.uncc.edu/gradmiss. Submission of the application form requires payment of a \$55 application fee which is paid online by credit card; the fee is neither deductible nor refundable. The application form compiles relevant applicant-specific data necessary as part of the application-for-admission process.
- 2) If you are seeking K-12 teacher licensure through the **Regional Alternative Licensure Center (RALC)**, you may apply for admission as a post-baccalaureate/non-degree student and must also submit a copy of your RALC plan of study directly to the Office of Graduate Admissions.

Notes:

- 1) *A separate application for admission is required for each graduate-level program of study, whether post-baccalaureate (non-degree), certificate, master's, or doctoral programs. A post-baccalaureate (non-degree) student who subsequently applies and is admitted to a graduate degree program may, with the permission of his/her advisor and the Graduate School, apply a maximum of six credit hours acceptably completed in the post-baccalaureate (non-degree) status toward a graduate degree or certificate program.*
- 2) *International Students should see the "Additional Admission Requirements for International Applicants" section of this Catalog for additional requirements.*

Additional Admission Requirements for all International Applicants

The following items must be submitted as part of the application process and are required before an admission decision can be rendered.

- 1) Official scores on the Test of English as a Foreign Language (TOEFL), the Michigan English Language Assessment Battery (MELAB) or the International English Language Testing System (IELTS), if English is not the applicant's native language and he or she has not earned a post-secondary degree from a U.S. institution. Required is either a minimum score of 83 on the Internet-based TOEFL, a minimum score of 220 on the computer-based TOEFL, a minimum score of 557 on the paper-based TOEFL, a minimum score of 78 percent on the MELAB, or a minimum overall band score of 6.5 on the IELTS. Applicants who are citizens of, or who have received an associate's degree or higher in one of the following countries, are exempt from the English language proficiency requirement: Australia, British Caribbean and British West Indies, Canada (except Quebec), Ireland, Liberia, New Zealand, United Kingdom, and United States. (An English language proficiency test is not required for those applying to post-baccalaureate non-degree study.)
- 2) For international students already in the USA: Proof of legal status in the USA (i.e., copy of visa, I-94 or BCIS Change-of-Status Approval Notice etc.)

Additional Enrollment Requirements for International Applicants on, or Intending to be on, F-1 or J-1 Visa Status

The following items may be submitted at any time during the application process. They are required for enrollment, not admission, purposes.

- 1) **International Financial Certification.** To be completed by the applicant, indicating his/her sources of funds and sponsors.

Students who are awarded financial aid by UNC Charlotte may subtract the amount of the financial aid from the required proof of financial resources as per the instructions listed on the International Financial Certification form.

Applicants who will be sponsored by their government, institutions, corporations, non-government agencies or other like entities must submit the agency's funding confirmation letter in addition to the International Financial Certification.

- 2) **Immigration Status Form.** Section 1 to be completed by all international applicants on, or intending to be on, F-1 or J-1 visa/status.

Applicants who are transferring to UNC Charlotte from an institution of higher education within the USA and who are already on F-1 or J-1 status, must also submit Page 2 of the Immigration Status Form, which must be completed by the Designated School Officer (DSO) or Responsible Officer (RO) at the US-institution from which they are transferring.

Form I-20 or DS-2019 for students on, or intending to be on, F-1 or J-1 visa status, will be issued by UNC Charlotte's International Student/Scholar Office after the applicant has been admitted to a degree program, financial certification has been submitted and approved, and immigration status has been verified.

Test Information

Applicants should have their test scores sent directly from the testing agency to the Office of Graduate Admissions (not to the department in which they wish to study). For the GRE and TOEFL, UNC Charlotte's institution code is 5105. For the MAT, UNC Charlotte's institution code is 1370. For the GMAT, please visit www.uncc.edu/gradmiss to determine the code of the program to which you plan to apply for admission.

A student who has already earned a Ph.D., M.D., or J.D. from a US institution will not be required by the Graduate School to take a standardized test. The Graduate Coordinator/Director of a program, however, has the right to request that the student take a test and submit official scores. This policy does not apply to the TOEFL/IELTS/MELAB.

A student who has already earned a Master's degree will not be required by the Graduate School to retake a standardized test **IF** the student can demonstrate that he or she has completed the test in the past. In such cases, the Graduate School will accept the official Student's Copy of the official test scores (note that a photocopy is not acceptable) or an official university transcript on which the scores are printed or a letter on official university letterhead attesting to the score. The Graduate Coordinator/Director, however, has the right to request that the student re-take the test and submit official scores. Please note that the above exception does not apply to the TOEFL/IELTS/MELAB.

A student who has taken the GRE, GMAT or MAT but has not earned a Ph.D., M.D. or J.D. from a US institution or a Master's degree (see above) must submit official scores that are less than five years old. If the student has not taken the test within five years, he or she must re-take the test.

Graduate Record Examination (GRE)

The GRE is not administered by UNC Charlotte. To obtain information about and schedule a test for the GRE, please visit the GRE website at www.gre.org.

Miller Analogies Test (MAT)

Harcourt Assessment, Inc administers the MAT. For additional information on the MAT, please visit www.milleranalogies.com. To register for the test at UNC Charlotte, please visit www.counselingcenter.uncc.edu/mat.htm, email matapp@uncc.edu, or call 704-687-4399. To register in another city or for more information, visit www.milleranalogies.com or call 1-800-622-3231.

Graduate Management Admission Test (GMAT)

The GMAT is sponsored, owned, and directed by the Graduate Management Admission Council (GMAC) and is administered by [Pearson VUE](http://www.pearsonvue.com). Visit the GMAC website at www.mba.com for additional information and to register for the GMAT. The GMAT Customer Service Telephone in the Americas is 1-800-717-GMAT (4628).

Test of English as a Foreign Language (TOEFL)

The TOEFL is offered at Educational Testing Service (ETS) Centers. To obtain additional information about the TOEFL or to register for the TOEFL online, please visit the TOEFL Website at www.toefl.org.

Michigan English Language Assessment Battery (MELAB)

The MELAB assesses Advanced level English language competence of adult non-native speakers of English, and scores on this battery may be submitted in lieu of TOEFL or IELTS scores. For further information, visit www.lsa.umich.edu/eli/testing/melab.

International English Language Testing System (IELTS)

The IELTS assesses the complete range of English language skills which students studying in English commonly encounter. For further information, visit www.ielts.org.

IMMUNIZATION REQUIREMENTS

North Carolina state law requires proof of immunizations to protect you and others while you are in attendance. Under North Carolina regulations, a student must be dropped from classes if the immunization requirements are not met. **Upon learning of your admission to the University you should submit your immunization records immediately.** Although a health physical is not required for admission to the university you are strongly encouraged to contact your healthcare provider or local health department to discuss additional recommendations for vaccinations. Further details regarding the immunization requirements including exemptions are available online at

www.studenthealth.uncc.edu. Please consult the website before submitting records to the University.

UNC Charlotte Student Health Center
 Attn: Immunization Department
 9201 University City Blvd
 Charlotte, NC 28223

COLLEGE/UNIVERSITY VACCINES AND NUMBER OF DOSES REQUIRED					
Vaccines Required	Diphtheria, Tetanus, and/or Pertussis ¹	Polio ²	Measles ³	Mumps ⁴	Rubella ⁵
Doses Required	3	3	2	2	1

FOOTNOTE ¹– DTP (Diphtheria, Tetanus, Pertussis), DTaP (Diphtheria, Tetanus, acellular Pertussis), Td (Tetanus, Diphtheria), Tdap (Tetanus, Diphtheria, Pertussis): 3 doses of tetanus/diphtheria toxoid of which one must have been within the past 10 years.

Those individuals enrolling in college or university for the first time on or after July 1, 2008 must have had three doses of tetanus/diphtheria toxoid and a booster dose of tetanus/diphtheria/pertussis vaccine if a tetanus/diphtheria toxoid or tetanus/diphtheria/pertussis vaccine has not been administered with the past 10 years.

FOOTNOTE ² – An individual attending school who has attained his or her 18th birthday is not required to receive polio vaccine.

FOOTNOTE ³ – Measles vaccines are not required if any of the following occur: Diagnoses of disease prior to January 1, 1994; An individual who has been documented by serological testing to have a protective antibody titer against measles; or An individual born prior to 1957. An individual who enrolled in college or university for the first time before July 1, 1994 is not required to have a second dose of measles vaccine.

FOOTNOTE ⁴ – Mumps vaccine is not required if any of the following occur: An individual who has been documented by serological testing to have a protective antibody titer against mumps; An individual born prior to 1957; or Enrolled in college or university for the first time before July 1, 1994. An individual entering college or university prior to July 1, 2008 is not required to receive a second dose of mumps vaccine.

FOOTNOTE ⁵ – Rubella vaccine is not required if any of the following occur: 50 years of age or older; Enrolled in college or university before February 1, 1989 and after their 30th birthday; An individual who has been documented by serological testing to have a protective antibody titer against rubella.

INTERNATIONAL STUDENTS: Vaccines are required as noted above. Additionally, International students are required to have a TB skin test and negative result within the 12 months preceding the first day of classes (chest x-ray required if test is positive)

FRESHMAN/TRANSFER STUDENTS: Immunization records are not sent with other admission records from your previous school. You must request your immunization records be sent directly to the Student Health Center.

Questions regarding this mandatory requirement may be directed to the Student Health Center Immunizations Department. at 704-687-7424. Please mail your records to:



University Regulation of Student Conduct

As students willingly accept the benefits of membership in the UNC Charlotte academic community, they acquire obligations to observe and uphold the principles and standards that define the terms of the UNC Charlotte community.

The University of North Carolina at Charlotte has enacted two codes governing student conduct: *The UNC Charlotte Code of Student Academic Integrity* and *The UNC Charlotte Code of Student Responsibility*. The University has also enacted a program for the prevention of the use of illegal drugs and alcohol abuse. All UNC Charlotte students are obligated to be familiar with these codes and to conduct themselves in accordance with the standards set forth.

Additionally, the Student Government Association has created a code called *The Noble Niner* that solidifies the high standard of morals, principles, and integrity that all students should strive to uphold to bolster the growing reputation of excellence at UNC Charlotte.

THE UNC CHARLOTTE CODE OF STUDENT ACADEMIC INTEGRITY

The UNC Charlotte Code of Student Academic Integrity governs the responsibility of students to maintain integrity in academic work, defines violations of the standards, describes procedures for handling alleged violations of the standards, and lists applicable penalties. The following

conduct is prohibited in that *Code* as violating those standards:

- A. **Cheating.** Intentionally using or attempting to use unauthorized materials, information, notes, study aids or other devices in any academic exercise. This definition includes unauthorized communication of information during an academic exercise.
- B. **Fabrication and Falsification.** Intentional and unauthorized alteration or invention of any information or citation in an academic exercise. Falsification is a matter of altering information, while fabrication is a matter of inventing or counterfeiting information for use in any academic exercise.
- C. **Multiple Submission.** The submission of substantial portions of the same academic work (including oral reports) for credit more than once without authorization.
- D. **Plagiarism.** Intentionally or knowingly presenting the work of another as one's own (i.e., without proper acknowledgment of the source). The sole exception to the requirement of acknowledging sources is when the ideas, information, etc., are common knowledge. (NOTE: For more information regarding plagiarism, see PLAGIARISM Appendix at www.legal.uncc.edu/policies/ps-105.html#APP.)
- E. **Abuse of Academic Materials.** Intentionally or knowingly destroying, stealing, or making inaccessible library or other academic resource material.

- F. **Complicity in Academic Dishonesty.** Intentionally or knowingly helping or attempting to help another to commit an act of academic dishonesty.

A full explanation of these definitions, and a description of procedures used in cases where student violations are alleged, is found in the complete text of The UNC Charlotte Code of Student Academic Integrity. This *Code* may be modified from time to time. Students are advised to contact the Office of the Dean of Students or go to www.legal.uncc.edu/policies/ps-105.html to ensure they consult the most recent edition.

THE UNC CHARLOTTE CODE OF STUDENT RESPONSIBILITY

Conduct Rules and Regulations

The following conduct, or an attempt to engage in the following conduct, is subject to disciplinary action: [Note: Letters J, P, and U have been intentionally omitted for continuity in record-keeping.]

- A. 1. Inflicting physical injury upon a person
 2. Placing a person in fear of or at risk of imminent physical injury or danger, or engaging in retaliatory threats against a person;
 3. Committing sexual invasion, sexual assault, or sexual misconduct, as those terms are defined herein;
 4. Committing sexual harassment as defined herein;
 5. Inflicting severe mental or emotional distress upon a person through a course of conduct involving repeated harassment, intimidation, abuse, or disparagement;
 6. Engaging in "fighting words" harassment, as that term is defined in Policy Statement #95 (online at www.legal.uncc.edu/policies/ps-95.html). The full text of Policy Statement #95 is available online or in the Office of the Dean of Students).
- B. Using, possessing, or storing any weapon, dangerous chemical, or explosive without authorization.
- C. Initiating or causing to be initiated any false report, warning or threat of fire, explosion, or other emergency.
- D. Interfering with normal University activities including, but not limited to, teaching, studying, research, the expression of ideas, University administration, speeches and other public or private events, and fire, police or other emergency services. Acts prohibited by this rule include, but are not limited to, those acts prohibited in University Policy Statement #58, "Interference with University Operations," found online at www.legal.uncc.edu/policies/ps-58.html, which prohibits student action taken "with intent to obstruct or disrupt any normal operation or function of the University," and Policy Statement #96, "Conduct at Speech Events," found online at www.legal.uncc.edu/policies/ps-96.html, which prohibits certain disruptive activities at speech events on campus. Full texts of both policies are available online or in the Office of the Dean of Students.
- E. Knowingly violating the terms of any student conduct sanction imposed in accordance with this Code.
- F. Possessing, consuming, or using any controlled substance or drug paraphernalia, or manufacturing, selling or delivering any controlled substance or possessing with intent to manufacture, sell or deliver, any controlled substance; huffing or sniffing any substance not intended for such use. Minimum penalties and certain other requirements apply where controlled substance offenses are at issue, pursuant to University Policy Statement #87, "Program to Prevent Use of Illegal Drugs and Alcohol Abuse." That Policy is available online at www.legal.uncc.edu/policies/ps-87.html or in the Office of the Dean of Students.
- G. Setting fires, or misusing or damaging fire safety equipment or elevators.
- H. Furnishing false information to the University; failing to report to the Office of the Dean of Students any criminal felony convictions that are entered against one (a) during the time between application for admission to the University and enrollment at the University, (b) during enrollment at the University, or (c) during any periods between enrollments at the University (such as the summer or during a withdrawal period) prior to returning to the University; misrepresenting or concealing one's organizational affiliation(s) or sponsorship(s) for the purpose of enticing another person into joining or participating in a group or organization; misrepresenting to a third party one's affiliation or enrollment status with the University.
- I. Forgery, unauthorized alteration, or unauthorized use or misuse of any document or instrument of identification (ID); displaying or using an ID that is not one's own or is fictitious, canceled, revoked, suspended, or altered; counterfeiting, loaning, or selling an ID to another person not entitled thereto.
- K. Theft or attempted theft of property, individual property, or services; breaking and entering into University property or the property of individuals on campus (including, but not limited to, private automobiles); the unauthorized use or access to private or confidential information in any medium; possessing stolen property; or possessing property that is not your own without owner authorization.
- L. Destroying, defacing, tampering with, or damaging the property of others or University property, including, but not limited to, chalking, spray painting, or

otherwise marking without appropriate University approval.

- M. Failing to comply with the reasonable directions of University officials, including but not limited to campus police officers or Housing and Residence Life Staff, acting in performance of their duties.
- N. Violating, aiding in violation of, or concealing evidence in violation of published University regulations or policies. Such regulations or policies include but are not limited to all Housing and Residence Life policies and the residence hall contract, as well as regulations relating to entry and use of University facilities, use of vehicles and amplifying equipment, campus demonstrations, and misuse of identification cards.
- O. Possessing, consuming, or distributing alcoholic beverages without University authorization, including but not limited to:
1. operating a motor vehicle under the influence of alcohol or while impaired by the consumption of alcohol;
 2. possessing or consuming alcoholic beverages by students less than twenty-one years of age;
 3. displaying or consumption of alcoholic beverages in campus residences by students less than twenty-one years of age;
 4. furnishing, or selling any alcoholic beverages to any person less than twenty-one years of age;
 5. public intoxication;
 6. failing to abide by the provisions of an "Acknowledgment of Responsibility for Service of Alcoholic Beverages" form; or
 7. making any sale of any alcoholic beverage on the University campus. (The full text of University Policy Statement #57, "Alcoholic Beverages," is available online at www.legal.uncc.edu/policies/ps-57.html or in the Office of the Dean of Students.)
- Q. Being present in or using, or aiding and abetting another in being present in or using, University premises, facilities, or property without University authorization.
- R. Using or possessing fireworks on University premises or at University activities without University authorization.
- S.
1. Engaging in conduct, such as loud, aggressive, or combative behavior, that disrupts or interferes with the normal functions of a class, including failure to conform to the instructor's announced expectations for classroom decorum. Disruptive conduct also includes use of cell phones or other electronic devices for voice or text communication in class, unless permitted by the instructor. (A student who persists in disruptive conduct as described above is subject to interim suspension set forth in Section XIII below.)
2. Engaging in disorderly conduct, such as fighting, threatening behavior, public disturbance, or drunk and disorderly conduct. Disorderly conduct also includes any unauthorized use of electronic or other devices to make an audio or video record of any person while on University premises without his/her prior knowledge, or without his/her effective consent when such a recording is likely to cause injury or distress. This includes, but is not limited to, surreptitiously taking pictures of another person in a gym, locker room, or restroom.
- T. Violation of Policy Statement #83, "Hazing," found online at www.legal.uncc.edu/policies/ps-83.html or in the Office of the Dean of Students.
- V. Engaging in **computer abuse**, including but not limited to violation of:
1. Policy Statement #8, "World Wide Web," found online at www.legal.uncc.edu/policies/ps-8.html
 2. Policy Statement #10, "Network Security," found online at www.legal.uncc.edu/policies/ps-10.html
 3. Policy Statement #20, "Electronic Communication Systems," found online at www.legal.uncc.edu/policies/ps-20.html
 4. Policy Statement #66, "Responsible Use of University Computing and Electronic Communication Resources," found online at www.legal.uncc.edu/policies/ps-66.html
 5. Policy Statement #67, "Proprietary Software," found online at www.legal.uncc.edu/policies/ps-67.html
 6. Policy Statement #102, "Data and Information Access and Security," found online at www.legal.uncc.edu/policies/ps-102.html
 7. Peer-to-Peer File Sharing Regulation, found online at www.legal.uncc.edu/policies/p2p.html
 8. Regulation on Security of Electronic Individually Identifiable Health Care Information under HIPAA, found online at www.legal.uncc.edu/policies/HIPAA.html
 9. Regulations on Information Systems Security, found online at www.legal.uncc.edu/policies/infosystemssecurity.html

10. Regulations on the Use of Social Security Numbers, found online at www.legal.uncc.edu/policies/ssn.html

- W. Gambling for money or other things of value except as allowed by law. Prohibited gambling includes, but is not limited to, betting on, wagering on, or selling pools on any athletic event; possessing any card, book, or other device (including that which uses the Internet) for registering bets, or bookmaking in connection with betting.
- X. Presence during any conduct prohibited by the Code of Student Responsibility that condones, supports, or encourages such prohibited conduct. Students who are present during a violation of the Code of Student Responsibility are expected to remove themselves from the situation and are encouraged to report the violation to the Office of the Dean of Students.
- Y. Commission of an act, or an attempt to commit an act, that: (i) is classified as a felony under North Carolina law; (ii) would be in violation of the General Statutes of the State of North Carolina; or (iii) would be in violation of any federal law. The University reserves the right to proceed with a hearing and the possible imposition of a sanction under the Code of Student Responsibility prior to, concurrent with, or subsequent to, civil litigation, criminal arrest, and/or criminal prosecution.

A full explanation of prohibited conduct, and a description of procedures used in cases where student violations are alleged, is found in the complete text of The UNC Charlotte Code of Student Responsibility. This *Code* may be modified from time to time. Students are advised to contact the Office of the Dean of Students or go to www.legal.uncc.edu/policies/ps-104.html to ensure they consult the most recent edition.

PROGRAM TO PREVENT USE OF ILLEGAL DRUGS AND ALCOHOL ABUSE (POLICY #87)

General

In keeping with efforts to maintain an environment that supports and encourages the pursuit and dissemination of knowledge, it is the policy of The University of North Carolina at Charlotte to consider the use of illegal drugs or alcohol abuse by students, faculty and staff or by others on premises under University control to be unacceptable conduct that adversely affects the educational environment.

To remind students, faculty, and staff of their responsibilities for maintaining a drug-free environment, this Policy will be distributed throughout the University

community each year. Further, the University considers a sound awareness, education, and training program indispensable in combating illegal use of drugs and alcohol abuse, both as a preventive measure and as a remedy. The scope of the University program addresses the awareness needs of students, faculty, administrators, and other staff members and includes the following minimum components.

- The health hazards associated with the use of illegal drugs and alcohol alone.
- The incompatibility of the use of illegal drugs or abuse of alcohol with maximum achievement of personal, social, and educational goals.
- The potential legal consequences (including both criminal law and University discipline) of illegal drug abuse and alcohol abuse.
- The effective use of available campus and community resources in dealing with illegal drug abuse and alcohol abuse problems.

Definitions

For the purposes of this Policy, the following definitions apply:

The term "alcohol abuse" is defined as a pattern of alcohol use leading to impairment or distress, including

1. alcohol use that contributes to (a) a failure to meet satisfactory job expectations or (b) interference with the ability to perform job responsibilities, (including repeated absences or poor work performance related to alcohol use);
2. alcohol use in situations in which it is physically hazardous to the user or others;
3. alcohol-related legal problems; or
4. social or interpersonal problems caused or exacerbated by the effects of alcohol use

The term "illegal drug use" is defined as use of those drugs or substances that is prohibited by state or federal law.

Responsibilities

It is the responsibility of all students, faculty, and staff to conduct themselves in a way that contributes to an environment free of illegal drug use and abuse of alcohol. In addition, students, faculty, and staff are responsible, as citizens, for knowing about and complying with the provisions of North Carolina law that make it a crime to possess, sell, deliver, or manufacture those drugs designated collectively as "controlled substances" in Article 5 of Chapter 90 of the North Carolina General Statutes, as well as federal law (Drug Free Workplace Act), which prohibits unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance in the workplace of any employer receiving federal grant funds.

The Director of Wellness Promotion is responsible for designing and carrying out a program of awareness education and training for students on the subject of preventing the illegal use of drugs and abuse of alcohol. The Director of Employee Relations, Training, and Compliance in the Human Resources department is responsible for awareness education and training programs for faculty and staff members in supervisory positions on the subject of preventing substance abuse.

The Director of the Counseling Center shall, within the limits of available resources, provide services and programs to students seeking assistance with problems of illegal drug use or alcohol abuse. In cases in which the treatment needs of such students exceed the resources of the Center, the Center shall provide referral to appropriate facilities in the community. The Director of Employee Relations in the Department of Human Resources shall provide faculty and staff information regarding the University's Employee Assistance Program (EAP), which will offer consultation about alcohol and drug problems and referral to alcohol and drug treatment facilities in the community. The Counseling Center shall also be available to provide community referral information for treatment of faculty and staff on request.

Collaboration with Community Resources

The University's program emphasizes collaboration with local resources such as the Substance Abuse Prevention Services of the Carolinas, Chemical Dependency Center of Charlotte-Mecklenburg, Mecklenburg County Substance Abuse Services, McLeod Center, Alcoholics Anonymous, Narcotics Anonymous, Al-Anon, Nar-Anon, etc. To this end, the University shall participate in the Charlotte-Mecklenburg Drug-Free Coalition and will work with local advisory boards to further collaborate between the University and the Charlotte Community.

Education and Prevention Activities

The University's awareness, education, and training efforts stress prevention. The goal of these efforts is (1) to encourage non-users of illegal drugs and alcohol to continue to be non-users, (2) to encourage users of alcohol to do so safely and responsibly, and (3) to encourage users of illegal drugs to stop such use.

Illegal Use of Drugs and Abuse of Alcohol

The use of illegal drugs and the abuse of alcohol are considered by the University to be problems that can be overcome. Therefore, the educational and rehabilitative services cited above are available on a confidential basis. However, the possession, sale, delivery, or manufacture of illegal drugs will not be tolerated on campus or off campus in the event that the interests of the University may be affected.

The University will cooperate fully with law enforcement agencies and will apply appropriate disciplinary procedures should a student, faculty member, or staff member violate criminal statutes with regard to illegal drugs. Violations may subject a student, faculty member, or staff member to prosecution and punishment by civil authorities and to disciplinary action by the University. It does not constitute "double jeopardy" for the University to initiate its own disciplinary proceedings for the same offense when the alleged conduct is deemed to affect the interests of the University.

Under federal law, employees convicted of any criminal drug offense occurring in the workplace are required to notify the University by informing the appropriate Vice Chancellor's office no later than five (5) days after such conviction. Disciplinary action and/or participation in a drug rehabilitation/education program as a result of University disciplinary proceedings must commence within 30 days of notice of conviction.

Upon receiving notice of a violation of this Policy, the University will initiate disciplinary procedures applicable to one's status as a member of the University community:

Status	Document
Students	<i>UNC Charlotte Code of Student Responsibility</i>
SPA Staff	<i>State Personnel Manual</i>
EPA Staff	<i>Policy Statement #64, Personnel Policies for Designated Employment Exempt from the State Personnel Act</i>
Faculty	<i>Section 603 of the UNC Code and Section 8 of the Tenure Policies, Regulations, and Procedures of UNC Charlotte</i>

Minimum sanctions set forth below shall also apply to employees who do not fall in any of the categories above.

In the event a student is also an employee of the University, the minimum sanctions for employment status as well as student status shall apply.

The use of illegal drugs may result in a variety of sanctions, from written warnings with probationary status to expulsion from enrollment or discharge from employment.

However, in accordance with the Policy on Illegal Drugs adopted by the Board of Governors of The University of North Carolina, the following minimum penalties shall be imposed for the particular offenses described:

Manufacture, Sale, or Delivery of Illegal Drugs

1. For the illegal manufacture, sale, or delivery of, or possession with intent to manufacture, sell, or deliver, any controlled substance, identified in Schedule I, N.C. General Statutes 90-89, or Schedule II, N.C. General Statutes 90-90, a student shall be expelled and a faculty member or staff member shall be discharged.

2. For a first offense involving the illegal manufacture, sale, or delivery, or possession with intent to manufacture, sell, or deliver, any controlled substance identified in Schedules III through VI; N.C. General Statutes 90-91, 90-92, 90-93, and 90-94, the minimum penalty shall be suspension from enrollment or from employment for a period of at least one semester or its equivalent. For a second offense, a student shall be expelled and a faculty member or staff member shall be discharged.

Illegal Possession of Drugs

1. For a first offense involving the illegal possession of any controlled substance identified in Schedule I, N.C. General Statutes 90-89, or Schedule II, N.C. General Statutes 90-90, the minimum penalty shall be suspension from enrollment or disciplinary suspension without pay from employment for a period of at least one semester or its equivalent.
2. For a first offense involving the illegal possession of any controlled substance identified in Schedule III through VI, N.C. General Statutes 90-91, 90-92, 90-93, and 90-94, the minimum penalty shall be probation, for a period to be determined on a case-by-case basis. A person on probation must agree to participate in a drug education and counseling program, consent to regular drug testing, and accept such other conditions and restrictions, including a program of community service, as the Chancellor or the Chancellor's designee deems appropriate. A requirement to undertake community service under this Policy may not be fulfilled by using paid Community Service Leave (www.hr.uncc.edu/Policies/PIM46.htm). Refusal or failure to abide by the terms of probation shall result in suspension from enrollment or disciplinary suspension without pay from employment for any unexpired balance of the prescribed period of probation.
3. For second or other subsequent offenses involving the illegal possession of controlled substances, progressively more severe penalties shall be imposed, including expulsion of students and discharge of faculty members or staff members.

Suspension for a Minimum Period of "One Semester or its Equivalent"

Suspension for a minimum period of "one semester or its equivalent" means forfeiture of at least one full semester of academic credit or attendance. Such a sanction may be accomplished either (1) by suspending the student for the unexpired balance or the semester during which responsibility is determined, with attendant loss of all academic credit for that semester, or (2) by placing the student on probation for the unexpired balance of the semester during which responsibility is determined and suspending the student for the duration of the next succeeding semester.

In the case of a faculty member or staff member, suspension for a minimum period of "one semester or its equivalent" means forfeiture of pay for a period of 18 weeks. Since the current State Personnel Act specifies that disciplinary suspensions cannot exceed two work weeks, offenses for which an eighteen-week minimum suspension is required by the Board of Governors' policy will result in discharge of an employee subject to the State Personnel Act.

Suspension Pending Final Disposition

When a student, faculty member, or staff member has been charged by the University with a violation of policies concerning illegal drugs, he or she may be suspended from enrollment or employment before initiation or completion of regular disciplinary proceedings if, assuming the truth of the charges, the Chancellor or, in the Chancellor's absence, the Chancellor's designee concludes that the person's continued presence within the University community would constitute a clear and immediate danger to the health or welfare of other members of the University community; provided, that if such a suspension is imposed, an appropriate hearing of the charges against the suspended person shall be held as promptly as possible thereafter.

References

The use of alcoholic beverages on the University campus is regulated by Policy Statement #57, "Policy on Alcoholic Beverages." Policy Statement #62, "Employee Assistance Program," establishes a free employee assistance service as part of the Department of Human Resources. Please also see Personnel Information Memorandum #18, "Drug Free Workplace Reporting Requirements" (www.hr.uncc.edu/Policies/PIM18.htm).

SMOKING ON UNIVERSITY PROPERTY (POLICY #68)

The University of North Carolina at Charlotte has a vital interest in maintaining a healthy and safe environment for its students, faculty, staff and visitors while respecting individual choice about smoking. Consistent with these concerns and with North Carolina law, the following policy establishes restrictions on smoking on University property and provides procedures for accommodating the preferences of both smokers and nonsmokers.

The following restrictions apply to smoking on University property:

- A. Smoking is prohibited within any University building, including residence halls.
- B. Smoking is prohibited within 25 linear feet of any University building.
- C. Smoking in University vehicles is prohibited.

D. Smoking is permitted on University property in Designated Smoking Areas only.

Additional smoking restrictions required for safety reasons may be imposed by the University on a case-by-case basis. Areas with such restrictions will be identified by signage. To read the entire campus policy statement on smoking, you may find it online at www.legal.uncc.edu/policies/ps-68.html.



Degree Requirements and Academic Regulations

About the Catalog

The *UNC Charlotte Graduate Catalog* (hereby referred to as the “*Catalog*”) is not an irrevocable contract. Regulations published in it are subject to change by the University at any time without notice. University regulations are policy statements to guide students, faculty, and administrative officers in achieving the goals of the institution. Necessary interpretations of these policies will be made by the appropriate authorities with the interest of the students and the institution in mind. Students are encouraged to consult an advisor if they have questions about the application of any policy.

The University reserves the right to change any of the rules and regulations of the University at any time, including those relating to admission, instruction, and graduation. The University also reserves the right to withdraw curricula and specific courses, alter course content, change the calendar, and to impose or increase fees. All such changes are effective at such times as the proper authorities determine and may apply not only to prospective students, but also to those who are already enrolled in the University.

Each new edition of the *UNC Charlotte Graduate Catalog* becomes effective at the opening of the fall semester following its publication. To receive a degree, an undergraduate student must satisfactorily complete all requirements described in the *Catalog* in effect at the time of first enrollment as a degree student at the University or all requirements described in the *Catalog* in effect at the time of graduation. Any student who changes from one major or

minor to another must meet requirements of the new major or minor in effect at the time of the change.

Any student who leaves the University or changes to another major or minor for a period of one calendar year or longer and then returns to the University or to the original major or minor will be required to meet requirements in effect at the time of return.

Exceptions to these policies may be necessitated by changes in course offerings, degree programs or by action of authorities higher than the University. In that event, every effort will be made to avoid penalizing the student.

Student Responsibility

Each student is responsible for the proper completion of his or her academic program, for familiarity with the *Catalog*, for maintaining the grade point average required, and for meeting all other degree requirements. Students assume academic and financial responsibility for the courses in which they enroll and are relieved of these responsibilities only by formally terminating enrollment. The advisor will counsel, but the final responsibility remains that of the student.

A student is required to have knowledge of and observe all regulations pertaining to campus life and student behavior. The University has enacted two codes of student responsibility --The UNC Charlotte Code of Student Academic Integrity and The UNC Charlotte Code of

Student Responsibility -- which are summarized in this *Catalog* and available in full online at www.legal.uncc.edu/policies/#student. As students willingly accept the benefits of membership in the UNC Charlotte academic community, they acquire obligations to observe and uphold the principles and standards that define the terms of UNC Charlotte community cooperation and make those benefits possible. This includes completion of institutional surveys as requested by the University for program assessment and improvement.

Each student is responsible for checking their uncc.edu email regularly, as well as maintaining communication with the University and keeping on file with the Office of the Registrar at all times a current address, including zip code, and telephone number.

Each student, while associated with the University, is expected to participate in campus and community life in a manner that will reflect credit upon the student and the University.

Course Load

An appropriate course load is dependent upon two factors: the scholastic ability of the student as reflected by his/her academic history and the time available for study. A course load of nine semester hours constitutes a normal full semester program for a graduate student. This is lower than the normal undergraduate load because of the extensive reading, independent thinking and individual research required of graduate students. Generally, graduate students should not register for more than 12 semester hours during a semester.

A graduate assistant must register for at least six graduate-level semester hours during each semester in which an assistantship is awarded. Graduate assistants enrolled in the Graduate Assistance Support Plan must+ register for a minimum of 9 graduate credit hours each term.

International students on F-1 visa/status are required, by immigration regulations, to pursue a full course load during each academic semester, except during official school breaks (e.g., summer vacation and winter holidays) or unless a reduced course load is approved in advance by the Designated School Officer (DSO) at the International Students/Scholar Office. Failure to enroll for a full course load without prior approval is considered a violation of the F-1 legal status.

Attendance Policy

Each instructor determines the attendance regulations for his or her classes. Students are expected to attend punctually all scheduled sessions in the courses for which they are registered and are responsible for completing the work from all class sessions.

Absences from class may be excused by the instructor for such reasons as personal illness, religious holidays, or participating as an authorized University representative in an out-of-town event. Whenever possible, students are expected to seek the permission of the instructor prior to absences.

Registration

The Registrar is responsible for the management of the registration process by which students enroll in classes. Registration policies and procedures for each term are described on the Registrar's website at www.registrar.uncc.edu/students.

Through the registration process, students assume academic and financial responsibility for the classes in which they enroll. They are relieved of these responsibilities only by formally terminating enrollment by dropping or withdrawing in accordance with deadlines specified in the Academic Calendar, which can be found online at www.registrar.uncc.edu/calendars/calendar.asp.

Registration Deadlines

University policies determine when students may enroll or adjust their enrollment in classes. Deadlines for the spring and fall semesters are shown below. (*Deadlines for summer sessions are approximately proportional based on the length of the session.*)

- **Register** for classes through the eighth instructional day of the semester.
- **Drop a class without record** (and remain enrolled in other classes) through the sixth instructional day of the semester.
- **Withdraw from the University without record** through the sixth instructional day of the semester.
- **Withdraw from a course with grade of W recorded** (and remain enrolled in other classes) through the tenth week of classes in the semester. No student will be allowed to drop a course after this deadline unless there are extenuating circumstances recognized by the University.
- **Withdraw from the University with grade of W recorded** after the sixth instructional day through the third week prior to the last day of classes of the semester. No student will be allowed to withdraw after this deadline unless there are extenuating circumstances recognized by the University. (See the "Termination of Enrollment" section of this *Catalog*.)

Prerequisites and Permits

Credit will be awarded only to students who are properly registered for a course. All students, including non-degree students, are required to meet course prerequisites and to obtain the required permissions through the department which sponsors the course.

Auditors

With the permission of the instructor, a student may register as an *auditor* for any class in which space is available. Fees and procedures for this non-credit enrollment are the same as those for a credit enrollment.

No student will be allowed to change the designation of a course from audit to credit or from credit to audit after the eighth instructional day of a semester (or a proportional period for summer school).

The participation of auditors in class discussion and in tests or examinations is optional with the instructor. Auditors receive no University credit, but they are expected to attend class regularly. A formal record of the audit on the student's transcript is entered at the discretion of the instructor at the end of the course. The procedure for adding or dropping an audit course is the same as for credit enrollments.

Early-Entry to Graduate Programs

Exceptional undergraduate students at UNC Charlotte may be accepted into some master's programs and begin work toward a graduate degree before completion of the baccalaureate degree. In those programs offering this option, an applicant may be accepted at any time after completion of 75 or more hours of their undergraduate course work, although it is expected that at least 90 hours of undergraduate course work will have been earned by the time the first graduate course is taken. These students will have provisional acceptance status in the graduate program, pending the award of the baccalaureate degree.

To be accepted in this program, the student must complete an application for the given graduate program and be accepted into that graduate program. In addition, the student must complete an Early-Entry Program Form and have it approved by the program coordinator and the Graduate School. *[Note: The Early-Entry Program Form must be approved by the Graduate School before the student begins the early-entry graduate course work. Failure to obtain prior Graduate School approval negates the ability to "double count" courses in an accelerated early-entry program.]* An undergraduate student must have at least a 3.2 overall GPA and have taken the appropriate graduate standardized test and have earned an acceptable score. A given program may have more rigorous admissions criteria. If an early-entry student has not met the normal admission requirements of a 2.75 overall undergraduate GPA and a 3.0 junior-senior GPA

at the end of his/her baccalaureate degree, she/he will be dismissed from the graduate program.

Students accepted into an early-entry program will be subject to the same policies that pertain to other matriculated graduate students. Early-entry students will finish their baccalaureate degrees before they complete 15 hours of graduate course work. No courses taken before admission to the graduate program may be applied to a graduate degree.

Some early-entry programs are also accelerated. Under this model, ordinarily up to six hours earned at the graduate level may be substituted for required undergraduate hours. In other words, up to six hours of graduate work may be "double counted" toward both the baccalaureate and graduate degrees. Individual programs may allow additional hours at the graduate level to be substituted. In no case may more than 12 hours be double-counted.

Not all graduate programs have the early entry option. A list of early-entry programs may be found online at www.uncc.edu/gradmiss/p_earlyentry.html.

[NOTE: Students admitted to an early-entry program are not eligible to hold a graduate assistantship since they have not completed a baccalaureate degree. Students admitted into an early-entry program pay graduate fees and graduate tuition for all courses (graduate and undergraduate) for which they register.]

Dual Undergraduate and Graduate Registration

First undergraduate degree students at UNC Charlotte who are required to take fewer than 12 semester hours of undergraduate work to fulfill all requirements for the bachelor's degree may be allowed **during their final semester** to enroll in certain courses for the purpose of obtaining graduate credit. Dually enrolled students will continue to be considered undergraduate students and be charged for the courses taken at the undergraduate level. To be considered for dual enrollment, students should submit the online post-baccalaureate graduate application for admission, submit a **Special Request** to the Graduate School requesting permission to be considered for dual enrollment, and attach to the **Special Request** a program of study outlining the requirements of the first undergraduate degree. The total hours to be carried in this status shall not exceed 12 hours, of which no more than nine may be for graduate credit. On the basis of work attempted prior to the final semester, such student must meet the grade point criteria for admission to a graduate degree program at the University. No course for which credit is applied to an undergraduate degree may receive graduate credit. Permission to take graduate courses under dual registration does not constitute admission to any graduate degree program at the University. (Undergraduate students may also take graduate courses if admitted to an Early-Entry Program.)

[Note: -Only UNC Charlotte students pursuing their first undergraduate degree are eligible for dual undergraduate and graduate registration. Fifth year undergraduate students (i.e., students pursuing a second undergraduate degree) are not eligible for dual undergraduate and graduate enrollment.]

Inter-Institutional Registration

An inter-institutional registration program is available for a limited number of undergraduate and graduate students with the University of North Carolina at Greensboro, North Carolina State University, University of North Carolina at Chapel Hill, Duke University, NC Central University, and NC A&T University. The registration process is initiated in the Office of the Registrar and requires the approval of the student's college dean.

Continuous Registration

Students in graduate degree programs are required to maintain continuous registration (fall and spring semesters) for thesis, dissertation, project, or directed study until work is completed. Students are not required to enroll in any summer term unless they are using campus facilities or they are completing degree requirements in that term. The continuous registration requirement begins with the semester in which the student first registers for his/her thesis, dissertation, project, or directed study. Students who exceed the required number of hours without completing their work should register for "7999" or "9999" (graduate student continuing registration credit) until the thesis, dissertation, project, or directed study is completed. Students who must remain continuously enrolled but are not using University resources should apply for a leave of absence. Students choosing this option must file a Special Request for a leave of absence that states they will not use University resources during the leave period. If the leave of absence extends beyond one calendar year, the student's matriculation is closed and the student must re-apply for active status in the graduate program. International students on F-1 visa/status must remain continuously enrolled until the thesis, dissertation, project or directed study is completed. Those international students who wish to apply for a leave of absence are advised to consult with the International Student/Scholar Office prior to filing the Special Request for leave of absence.

Note: *Students must be enrolled during the term (semester or summer) in which they graduate from the University.*

Transferred Credit

The student's graduate program coordinator is responsible for determining the applicability of transferred credits to graduate program requirements. See the appropriate "Degree Requirements" sections of this *Catalog* for program-specific policies. General rules governing transferred credit are:

To obtain approval to receive transfer credit, the student must submit an *Application for Transfer of Credit into a Graduate Degree Program* form (available in the Graduate School office or online), approved by the graduate program coordinator, to the Dean of the Graduate School. If the courses being transferred are from another institution, the student must include an **official** copy of the transcript along with the request. **The University is not obligated to accept any courses for transfer credit.**

No more than six semester hours of transfer credit will be considered for acceptance into a master's degree program. The amount of transfer credit that may be accepted into a doctoral program varies by program. See program specific policies in this *Catalog*.

Undergraduate courses are not transferable for graduate credit.

Graduate courses that appear in the undergraduate section of a transcript are only transferable if the Registrar of the institution where the credit was received can verify in writing that the graduate courses in question were not counted toward the student's undergraduate degree requirements.

Courses which have been taken as part of any graduate program at UNC Charlotte or another institution for which the student has received a master's or doctorate degree are not transferable into a second master's degree program. The transferability of master's degree or doctoral course work into a doctoral program varies by program. See program specific policies in this *Catalog*.

The grade in any course accepted for transferred credit must be "A" or "B" as defined by UNC Charlotte. Courses that have been graded on a Pass/No Credit or Satisfactory/Unsatisfactory basis will not be accepted for transfer. It should be noted that, although the credit for a course may transfer, the grade will not be used to calculate the graduate GPA at UNC Charlotte.

Courses accepted for transfer are subject to the same time limitation as courses taken in residence.

To be considered for transferred credit, the courses must have been undertaken at a regionally accredited institution.

Courses in which credit is accepted must be appropriate for approved University programs and curricula in which the student is enrolled.

Transfer credit is not awarded for non-degree seeking graduate students (i.e., post baccalaureate students).

Credit by Examination

A student currently enrolled at UNC Charlotte may pass a specially prepared challenge examination and receive credit for a University course without having to do the normal course work. The student contacts the program in which credit is sought to request administration of an examination. Since it may not be appropriate to award credit by examination for some courses, the decision to offer an examination is that of the program. If the graduate program authorizes an examination, the student is instructed to pay

the fee for credit by examination and to bring the receipt of payment to the examination. Credit by examination will be indicated on the transcript, but no grade points will be awarded. Failure on such an examination will incur no grade-point penalty. No student may challenge a course for which either a passing or failing grade has been received at UNC Charlotte.

Change of Degree Program

To change from one degree program to another, a graduate student must complete the application for admission to the new program, pay the requisite application fee, submit a Statement of Purpose, and provide supporting documentation as specified in this Catalog in a timely manner. The student should also provide the Graduate School with a letter indicating withdrawal from the initial degree program. Contact the Office of Graduate Admissions for additional information.

[Note: Students on F-1 or J-1 visa status who change from one degree program to another may be required to submit proof of sufficient financial resources, especially if the change to another degree program requires the issuance of a new Form I-20 or DS-2019.]

Application for the Degree and/or Graduate Certificate

Each student should make application for his/her degree and/or graduate certificate by completing the on-line Application for Degree through Banner Self Service no later than the filing date specified in the University Calendar. In addition, all graduate students must submit an Application for Candidacy form to the Graduate School no later than the filing date specified in the University Calendar. Each member of the graduating class is automatically charged a graduation fee of \$57 at the time he/she applies for the degree and/or certificate. Degrees and certificates are conferred at commencement exercises held at the end of the spring and fall semesters; however, the diploma, graduate certificate and transcript will reflect the term in which all requirements were completed. Graduate degree diplomas and graduate certificates are mailed directly to the student after graduation clearance has been completed.

Students completing their degree requirements in May, participate in the May commencement ceremony. Students completing degrees in a summer term as well as those completing in December, participate in the December commencement ceremony.

Earning a Second Degree

A student is permitted to earn a second graduate degree subject to the following conditions:

- 1) no work applied to a previously awarded degree may be applied to the new degree program

the student must be admitted to a degree program different from that of his/her previous graduate degree(s)
the student must successfully meet all requirements for the new degree

Dual Master's Degrees

In certain instances it may be possible for a student to obtain dual degrees in two master's programs through the development of an integrated curriculum. **It is important to remember that a dual master's degree requires a special arrangement and should be viewed as atypical to standard practice. No degree program is obligated to enter into such an arrangement.**

Although other restrictions may apply, basic admission and degree requirements are specified below:

- 1) The student must apply to each program separately and be admitted to both. No admission requirements established by the Graduate School or by either individual program may be waived. For example, if one degree requires acceptable scores for the GRE and the other the MAT, the applicant must take each standardized exam to be considered for admission to both degrees.

Once admitted, the student must develop a suitable plan of study that is acceptable to both programs and to the Graduate School. **This plan of study must be done within the first semester of matriculation and in conjunction with both program coordinators or directors.** The plan of study must be forwarded to the Dean of the Graduate School for review and approval.

The student's advisory committee must have representation from both degree programs. If there is no advisory committee, the student must have two advisors; one from each program.

The number of required credit hours for both degrees must not be less than 75% of the total minimum hours required to complete each degree separately. For instance, if degree program X requires 30 credit hours and Y 30 credit hours, a proposed dual degree should at a minimum require 45 credit hours.

The coordinator or director of each degree must agree on which courses may be applied to both sets of graduation requirements.

The student must complete the capstone requirements for both programs. For example, if program X requires a written thesis and program Y requires a comprehensive exam, the student must meet both degree obligations.

If there is a compulsory qualifying exam in each curriculum, it may be possible for the student to take a single exam as long as the examination committee agrees that the assessment covers sufficient background information for each discipline. If only one program requires a qualifying exam, the student is obligated to take the exam.

If the student withdraws or is suspended from one of the participating programs, the dual degree arrangement is automatically nullified.

All standard policies relating to transfer of courses, time to degree, residency requirements, and minimum GPA required to graduate, apply to any dual degree arrangement.

All of the coursework in the combined program of study must be completed before the student can apply for either of the degrees.

[Note: No dual degrees will be awarded retroactively.]

Termination of Enrollment

Drop or Withdrawal of a Course

A student may terminate enrollment in a course but continue enrollment in other courses by following the procedure to drop or withdraw from a course specified on the Registrar's website at www.registrar.uncc.edu. A student enrolled in only one course must withdraw officially from the University to drop the course.

Withdrawal from the University

Any graduate student voluntarily leaving the University before the close of the term must withdraw officially. A student initiates the withdrawal procedure and files the completed form at the Office of the Registrar in person or by letter. A withdrawal is effective when the form or letter is received by the Office of the Registrar. A student who withdraws from the University after the eighth instructional day will receive the grade of *W* for all courses in progress. No student will be allowed to withdraw within two weeks prior to the last day of class (or as close to half the summer term as possible) unless there are extenuating circumstances such as serious illness recognized by the University and approved by the Dean of the Graduate School.

Any graduate student who leaves the University before the close of a term without withdrawing officially will receive a failing or unsatisfactory grade (*U* for graduate credit) in each course for which he/she is registered. A graduate student who receives a *U* is automatically suspended or terminated from the University and must appeal to the Dean of the Graduate School for reinstatement.

International students on F-1 or J-1 visa status must carry a full course load each academic semester. (Some exceptions apply. See International Student/Scholar Office for further information.) Students who withdraw from UNC Charlotte are advised to consult the International Student/Scholar Office for information on maintaining valid F-1 or J-1 status, or reinstatement to valid F-1 or J-1 status.

Course Descriptions

Course descriptions provide the following information: subject prefix; course number; course title; semester credit hours assigned to the course; prerequisites and/or corequisites (if any); brief description of the course content; and when the course usually is offered (Evenings, Yearly, Alternate years, Fall, Spring, Summer, On demand). The description may specify the number of class (lecture) and/or laboratory sessions and hours. If no class hours are given, the number of class hours per week is the same as the number of semester hours credit assigned to the course.

For example:

SUBJ 6234. Title of Course. (Credit Hours)

Pre/corequisites. Brief description of course content. (Three lecture hours and one three-hour laboratory per week) (*When offered*)

Course Numbering System

Courses are identified by four-digit numbers. The first digit indicates the level of the course: 5000-5999 = graduate courses with parallel undergraduate courses listed at the 4000 level; 6000-7999 = master's level courses; 8000-9999 = doctoral work. The following second digits designate special types of courses: 0 for topics; 4 for internships and practicum, 5 for cooperative education, 6 for seminars, 7 for Honors courses, 8 for independent study, and 9 for research.

Grading Policies

Instructors assign grades on the basis of their evaluation of the academic performance of each student enrolled in their courses. At the end of the term, the grades are reported to the Office of the Registrar which is responsible for maintaining student academic records and making grades available to students.

Final Grades

Final grades are available through the secure student access pages of 49er Express found online at www.express.uncc.edu.

Final Grade Changes and Appeals from Final Course Grades

When a final course grade other than Incomplete (*I*) is officially reported by the instructor at the end of an academic term, the grade is recorded by the Registrar and can be changed only if the grade has been assigned arbitrarily or

impermissibly as defined in the Faculty's "Policy and Procedures for Student Appeals of Final Course Grades," available online at www.legal.uncc.edu/policies/gradeappealguide.html.

For guidelines on applying this policy, see: www.legal.uncc.edu/policies/GradeAppealGuide.html

Students should follow the procedures outlined in that policy if they believe that the final course grade that has been assigned is incorrect. The policy encourages the student to discuss the grade with the instructor as soon as possible after the grade is received. Students should note, however, that the University is not obliged to respond to a grade appeal unless the student files it with the appropriate department chairperson or interdisciplinary program director within the first four weeks of the next regular academic semester. When a grade is assigned consistent with University policy, only the instructor has the right to change the grade except as provided in the Incomplete grade policy. When an instructor reports a grade change for a grade other than *I*, the *Change of Grade Form* must be signed by his/her Department Chairperson and the Dean of the Graduate School.

Grades

Letters are used to designate the quality of student academic achievement.

Graduate Grades		
Grade	Definition	Grade Points per Semester Hour
A	Commendable	4
B	Satisfactory	3
C	Marginal	2
U	Unsatisfactory	0
I	Incomplete	
IP	In Progress	
W	Withdrawal	
P	Pass	
N	No Credit	
AU	Audit	
NR	No recognition given for audit	

Grade of I (Incomplete)

The grade of "I" is assigned at the discretion of the instructor when a student who is otherwise passing has not, due to circumstances beyond his/her control, completed all the work in the course. The missing work must be completed and the final grade reported within one calendar year from the date on which the "I" grade was recorded. The instructor assigning the "I" grade may specify a shorter time than one year for completion of the work and the assignment of a final grade. If the "I" is not removed during the specified time, a grade of "U" is automatically assigned. Time extensions for

the completion of an "I" beyond one year cannot be approved except by special request to the Graduate School under extraordinary circumstances. The grade of "I" cannot be removed by enrolling again in the same course. (Note: An "I" grade should not be assigned for a student who has never attended a class or who has quit attending a class and is failing.)

Grade of IP (In Progress)

The grade of "IP" is based on coursework for courses that extend over more than one semester. For example, a course that requires enrollment for two consecutive semesters would be eligible for an "IP" grade in the first term (i.e., Certificate Project, Master's Thesis, Master's Project, Doctoral Dissertation, etc.) The grade in the second term is also awarded for the course in the first semester. A grade of "IP" should not be given for coursework to be completed in one given term. It cannot be substituted for a grade of "I." For a student in good standing in a certificate program, an "IP" grade expires after four years, and if no final grade has been awarded by that time, the "IP" grade will default to a grade of N (no credit). For a student in good standing in a master's degree program, an "IP" grade expires after six years, and if no final grade has been awarded by that time, the "IP" grade will default to a grade of N (no credit). For a student in good standing in a doctoral program, an "IP" grade expires after eight years, and if no final grade has been awarded by that time, the "IP" grade will default to a grade of N (no credit).

Grade of W (Withdrawal or Drop)

No grade will be given for a course dropped on or before the last day to drop a course without record. After this period a student who is permitted to drop or withdraw from a course will receive a grade of *W*. Only students with such extenuating circumstances as serious illness will be permitted to drop a course after the tenth week of classes in the semester or to withdraw from all courses during the last two weeks of classes in the semester. Unsatisfactory academic performance itself is not an extenuating circumstance. The date of withdrawal is determined when the withdrawal form is accepted by the Office of the Registrar.

Grade of N (No Credit)

The grade of *N* (No Credit) is used in very special circumstances. The *N* grade signifies that there is no credit given for the course. Therefore, any course that receives the *N* grade does not enter into the student's grade point average. The *N* grade is used for all master's and doctoral level, resident and non-resident, graduate student continuing registration courses that are numbered 7999 or 9999. The *N* grade is also used to replace "IP" grades which have expired. These are the only two uses for the *N* grade.

Pass/Unsatisfactory Option

Certain graduate courses, such as research seminars, tutorials, internships, theses or dissertations, may be designated for *Pass/Unsatisfactory* grading upon recommendation of the

offering department and approval of the Graduate Council. The grade of *P* in such a course shall be considered as evidence of satisfactory performance. A grade of *U* (Unsatisfactory) will affect eligibility for continued enrollment and will not apply toward requirements for the degree.

Graduate Grades		
Grade	Definition	Grade Points per Semester Hour
A	Commendable	4
B	Satisfactory	3
C	Marginal	2
U	Unsatisfactory	0
I	Incomplete	
IP	In Progress	
W	Withdrawal	
P	Pass	
N	No Credit	
AU	Audit	
NR	No recognition given for audit	

Grade Point Average (GPA)

The grade point average for a graduate student is based only on those graduate courses taken at UNC Charlotte. It is determined by multiplying the number of grade points for each grade ($A=4$, $B=3$, $C=2$, $U=0$) by the number of semester hours credit received in that courses adding all accumulated grade points together, and then dividing by the total number of semester hours the student has attempted except those for which the student received a grade of *I*, *IP*, *W*, *P*, *N*, *AU*, or *NR*. When a course not listed as "May be repeated for credit" is repeated, no additional credit hours attempted accrue and the hours earned and grade points of the previous grade are replaced by those of the current grade.

Graduate students must have a 3.0 GPA in the courses on their degree plan of study in order to graduate. However, the grades for all courses attempted will remain on the transcript and will be included in the calculation of the student's GPA as it is reported on the transcript (except as described in the above paragraph).

Repeating a Graduate Course

A graduate student will be allowed to repeat a maximum of two courses in which the student has been assigned a grade of *C* or *U* (but not an *I*). If the course grade has resulted in suspension or termination of enrollment, the student must appeal to be reinstated in order to repeat the course. A given course may be repeated one time only. Each grade earned in a repeated course is shown on the student's transcript. The record of the first attempt will remain a part of the student's permanent record and will count in the number of marginal (*C*) grades accumulated. However, the hours earned and

grade in the first attempt will not be computed in the grade point average. Successfully repeating a course does not change the number of marginal (*C*) grades accumulated. Enrollment will be terminated if a student receives a grade of *U* in a repeated course for which the student previously earned a *U*.

Academic Standing

Requirements for Continued Enrollment

All graduate students whether degree seeking or non-degree seeking (post baccalaureate) must maintain satisfactory grades. In addition, students enrolled in any graduate program must maintain satisfactory progress toward the degree. Students are expected to achieve a commendable or satisfactory grade (*A* or *B*) in all course work attempted for graduate credit. Students who fail to maintain satisfactory progress toward their degree or who do not achieve commendable or satisfactory grades in all their graduate course work are subject to suspension and/or termination from their program of study and/or the Graduate School.

International students on F-1 or J-1 visa status must carry a full course load each academic semester (Some exceptions apply. See International Student/Scholar Office for further information.) Students who are suspended or terminated from their program of study are advised to consult the International Student/Scholar Office for information on maintaining valid F-1 or J-1 status, or reinstatement to valid F-1 or J-1 status.

Academic Suspension

All graduate students (degree seeking and post baccalaureate) are subject to academic suspension. An accumulation of three marginal *C* grades in any graduate course work will result in suspension of the student's enrollment. If a student makes a grade of *U* in any graduate course, enrollment will be suspended. A graduate student whose enrollment has been suspended because of grades is ineligible to register in any semester or summer session unless properly reinstated.

Note: Some Departments and/or programs have stricter regulations on suspension than those of the Graduate School. See the academic regulations presented in the program specific sections of this Catalog.

Appeal Procedure

Graduate students may appeal a suspension or termination using the procedures described in the following paragraphs. Other grievances relating to academic status are to be addressed to the Graduate School.

Appeal of Academic Suspension for the Purpose of Reinstatement

A student who has been suspended from the Graduate School and/or a program of study may appeal his/her suspension and must be reinstated in order to continue his/her studies. After notification of suspension is received, the student initiates the appeal procedure by submitting a “*Suspension Appeal Form*” to the graduate coordinator/director of his/her academic program explaining any extenuating circumstances. The graduate coordinator/director will forward this form to the Graduate School with a recommendation regarding reinstatement. Non-degree seeking students submit the “*Suspension Appeal Form*” directly to the Graduate School or, in the case of licensure students in the College of Education, to the Associate Dean of the College of Education. The Dean of the Graduate School makes the decision on the suspension appeal and notifies the student of the decision in writing.

A student readmitted to a graduate program through reinstatement will be expected to complete the degree program with satisfactory or commendable performance (“A” or “B” grades). Should a student receive a grade of *C* or *U* in a graduate course after being reinstated to the program, enrollment in the graduate program will be terminated.

A student who is denied readmission through the suspension appeal process is considered to be terminated from the Graduate School and/or the graduate program. Terminated students may appeal their termination as identified in the section entitled “*Appeal of Academic Termination for the Purpose of Reinstatement.*”

Academic Termination of Non-Degree Seeking Students

Academic termination of non-degree seeking (post-baccalaureate) students may occur in two ways.

1. A student’s graduate status will be terminated if, after receiving an initial suspension (see “*Academic Suspension*”) and subsequent reinstatement (see “*Appeal of Academic Suspension for the Purpose of Reinstatement*”), the student receives a grade of *C* or *U* in a graduate-level course.
2. Students who are suspended from the Graduate School and are denied re-admittance through the suspension appeal process (see “*Appeal of Academic Suspension for the Purpose of Reinstatement*”) are considered terminated from the Graduate School.

Academic Termination of Degree Seeking Students

Academic termination of a graduate student’s program of studies may occur in four ways.

1. Students may be required to terminate their graduate studies if they fail to maintain satisfactory academic progress. One example of failure to maintain satisfactory academic progress is non-adherence to the schedule of “*Time Limits for Degrees.*”

When a program determines that a student is making unsatisfactory progress, the program notifies the student in writing of the program’s concern about the student’s performance. Such a warning specifies the source of the concern, the applicable program and/or Graduate School rules, and the proposed action. Warnings specify when and on what basis a recommendation for academic termination will be considered by the program. A probationary period of one academic semester is normal.

Following the probationary period, a student who fails to meet the provisions of the warning is subject to termination from the program. If the program believes that termination is warranted, the graduate program director or coordinator communicates to the Dean of the Graduate School in writing the specific reasons involved, all warnings communicated to the student, the program and/or advisory committee procedures and actions leading to the recommendation, and the mailing address of the student. After considering all of the information, the Dean will make a decision. If the decision is to terminate, the Dean will notify the student of his/her termination from the Graduate School.

2. A student’s graduate studies may be terminated if he/she fails to maintain the specific standards of the student’s academic program as described in the program specific sections of the Graduate Catalog. For example, a doctoral program may indicate that the accumulation of two *C* grades or one *U* grade is grounds for termination from the program.
3. A student’s graduate studies will be terminated if, after receiving an initial suspension (see “*Academic Suspension*”) and subsequent reinstatement (see “*Appeal of Academic Suspension for the Purpose of Reinstatement*”), the student receives a grade of *C* or *U* in a graduate level course.
4. Students who are suspended from a graduate program and are denied re-admittance through the suspension appeal process (see “*Appeal of Academic Suspension for the Purpose of Reinstatement*”) are considered terminated from their graduate program.

In all cases of termination from a graduate program, the student’s transcript will bear the notation “Candidacy Terminated.”

Readmission of Terminated Graduate Student

Students who have been academically terminated from the Graduate School and/or a UNC Charlotte graduate program are not eligible for readmission as either a degree seeking or

non-degree seeking graduate student. However, if **after two years** the student can demonstrate the potential for academic success and/or personal and professional development since leaving the University, the student may initiate a request for readmission to the Graduate School. The student may initiate the request for readmission to the program from which he/she was terminated, to a different graduate program, or as a post-baccalaureate student. Students seeking readmission must submit a new application package which includes the full set of materials identified in the section entitled “*General Application Requirements for Admission*.” In addition, the student must include a letter explaining the circumstances that led to his/her termination from the UNC Charlotte Graduate School and a discussion of the academic and/or personal and professional development since last attending the University that has prepared him/her for a successful return to graduate studies.

Appeal of Academic Termination for the Purpose of Reinstatement (Post-Baccalaureate Students)

While an action of termination is considered final, a post-baccalaureate student who is terminated may appeal that termination to the Graduate School if there are unusual or extenuating circumstances.

To initiate an Appeal of Academic Termination, the student must send a written letter to the Graduate School requesting consideration of his/her case by the UNC Charlotte Graduate School Appeals Committee. In the written request, the student must make his/her case for reinstatement. If appropriate, the student may include two letters from UNC Charlotte faculty or academic administrative personnel who are knowledgeable of the students academic capabilities and are supportive of the students reinstatement to the Graduate School. A termination appeal request and the supporting documentation must be received by the Graduate School within 30 days of the date on the letter of termination.

Once the Graduate School receives the Appeal of Termination, it will be forwarded to the Chair of the Graduate School Appeals Committee. This Committee will review all relevant materials and make a recommendation to the Dean of the Graduate School. The Dean of the Graduate School makes the decision on the Appeal of Termination case and his/her decision is final.

Appeal of Academic Termination for the Purpose of Reinstatement (Degree Seeking Students)

While an action of termination is considered final, a student who is terminated from a graduate program may appeal that termination to the Graduate School if there are unusual or extenuating circumstances. The type of academic termination will determine the permissible grounds for the petition and the specific procedure utilized to initiate the appeal.

Category 1: Academic Termination Based on Failure to Maintain Commendable or Satisfactory Performance in Course Work

Category 1 appeals are available to students who have been terminated for receiving a *U* or *C* grade after an initial suspension and students who fail to maintain the specific grading standards of an academic program. In these cases, an Appeal of Academic Termination submitted to the Graduate School must be supported by the student’s graduate program. Without support from the student’s graduate program, academic termination of this type is always considered a final action.

To initiate a Category 1 Appeal of Academic Termination, the student must send a written letter to the Graduate School requesting consideration of his/her case by the UNC Charlotte Graduate School Appeals Committee. In the written request, the student must make his/her case for reinstatement. Included with the student’s letter must be at least two letters of support for reinstatement from the student’s academic program. For master’s degree students, the termination appeal should include a letter from the program coordinator/director and a letter from the department chair, major advisor and/or the thesis/project advisor. For a doctoral student, a termination appeal should include a letter from the program coordinator/director and the advisory committee or dissertation committee chair. The letters from the program must specify what expectations must be met by the student if he/she is readmitted to the program. A termination appeal request and the supporting documentation must be received by the Graduate School within 30 days of the date on the letter of termination.

Once the Graduate School receives a Category 1 Appeal of Termination, it will be forwarded to the Chair of the Graduate School Appeals Committee. This Committee will review all relevant materials and make a recommendation to the Dean of the Graduate School. The Dean of the Graduate School makes the decision on the Appeal of Termination case and his/her decision is final.

Category 2: Academic Termination Based on Programmatic Action

Category 2 appeals are for students who have been terminated for failure to maintain satisfactory progress in an academic program and for students who have been denied readmittance through the suspension appeal process. Academic decisions based on the disciplinary expertise and judgment of graduate faculty members and program coordinators/directors in a particular field are not subject to appeal. The fact that a programmatic decision goes against a student’s desire for continuation in an academic degree program is not grounds for a termination appeal. However, a Category 2 appeal may be brought on the grounds that there

was “procedural error” or “discrimination” in the termination decision.

To initiate a Category 2 Appeal of Academic Termination, the student must send a written letter to the Graduate School requesting consideration of his/her case by the UNC Charlotte Graduate School Appeals Committee. In the written request, the student must make his/her case for reinstatement. If the student is alleging “procedural error,” the student must specify what procedures were utilized and how the program deviated from the specified procedures. If the basis of the appeal is “discrimination,” the student must show how his/her case was handled substantially different from those of other students in similar circumstances. A termination appeal request and the supporting documentation must be received by the Graduate School within 30 days of the date on the letter of termination.

Once the Graduate School receives a Category 2 Appeal of Termination, it will be forwarded to the Chair of the Graduate School Appeals Committee. The Chair of the Appeals Committee will contact the program in question and request a response to allegations of “procedural error” and/or “discrimination.” The program will have two weeks to respond to the request of the Appeals Committee Chair. Once all relevant information had been received, the Committee will review the materials and make a recommendation to the Dean of the Graduate School. The Dean of the Graduate School makes the decision on the Appeal of Termination case and his/her decision is final.

Graduate School Appeals Committee

The Graduate School Appeals Committee is authorized to review appeals for reinstatement from graduate students who have been academically terminated. The Committee does not hear grade appeals, for which a separate procedure exists. The Appeals Committee is comprised of four members. The Assistant Dean of the Graduate School serves as the ex officio, non-voting chair of the committee. The three voting members of the Appeals Committee are graduate faculty members named by the Dean of the Graduate School. The Graduate Faculty members serve a staggered three year term.

Master’s Degree Requirements

Residence Requirements

No more than six semester hours of transferred credit are accepted toward a master’s degree. All other work must be residence credit.

Residence credit is credit that is earned under the conditions specified herein and may be applied toward the attainment of graduate degrees at UNC Charlotte. These conditions must be satisfied regardless of the location (on campus, online, or distance) in which the course is given.

- 1) **Instruction:** The instructor must be a member of the UNC Charlotte Graduate Faculty.
Course(s): The content of each course must be approved by regularly established college, Graduate School and University curricular processes before the course is scheduled or offered.

Residence credit may also be awarded by virtue of an examination administered by the Graduate Faculty of the department offering credit. A student also, with the prior approval of the appropriate UNC Charlotte department and the Dean of the Graduate School, may take graduate courses for residence and course credit at other regionally accredited institutions.

Advisory Committee

All students in graduate programs must have a graduate advisor who is a regular member of the Graduate Faculty in the student's major program. The graduate program coordinator/director appoints the graduate advisor. In the case of master's programs requiring theses and/or final oral examinations, the graduate advisor serves as chair or co-chair of the committee.

In all master's programs requiring a committee, the committee will consist of at least three graduate faculty members, one of whom is designated as chair. In programs not requiring a committee, only a major advisor is necessary.

Program Approval

Each student's individual program of study must be approved by his/her department/college. A maximum of six hours of transferred credit may be included in the approved program of study.

Admission to Candidacy

Upon successful completion of a minimum of 18 semester hours of graduate work and in no case later than the eighth instructional day of the semester in which he/she expects to complete all requisites for the degree, a student should file for admission to candidacy on a form supplied by the Graduate School. This application is a check sheet approved by the student's graduate coordinator/director, listing all course work to be offered for the degree (including transferred credit and courses in progress).

Minimum Hours and Quality

A student is expected to satisfactorily complete a minimum of 30 to 60 semester hours of approved graduate level

courses, depending upon his/her individual program, with an overall GPA of 3.0 or better in courses on the degree plan of study. Grades in all courses attempted, whether or not on the plan of study, will remain on the transcript and will be included in the calculation of the student's GPA as it is reported on the transcript. No more than six hours evaluated as *C* may be counted toward the minimum hours required for the master's degree.

Culminating Experience

Each student must pass a graduate culminating experience which may take the form of a comprehensive exam, thesis defense, project presentation, or other appropriate capstone evaluation. If a comprehensive exam is given, the examination may be written, oral, or both, depending upon the student's specific program requirements. Generally, a student is allowed to take the comprehensive exam two times. A student who fails the comprehensive exam the second time is terminated from the master's degree program. Students must be enrolled during the semester in which they take the comprehensive examination or any other type of culminating experience.

Time Limit

University policy requires that no course listed on a master's student's candidacy form be older than six years at the time of graduation. This policy is in place because of the University's interest in a degree being current when it is awarded. Courses that exceed this time limit must be revalidated or retaken, whichever the graduate program decides necessary, if they are to count in a degree program.

To revalidate a course, the student, along with the program coordinator and the course instructor, prepare a revalidation plan that must be reviewed and approved by the Dean of the Graduate School. This plan often involves taking a special examination designed by the faculty of the graduate program. Once the plan has been completed, the program coordinator must notify the Dean of the Graduate School in writing. The Revalidation Form is available on the "Forms" page of the Graduate School website at www.uncc.edu/gradmiss/gforms.html.

Students may not revalidate courses with a grade of *C* or lower, courses that are internships or other forms of practica, or courses taken at other institutions. **Additionally, no more than 25% of the courses on a student's program of study may be revalidated and for master's students no course older than eight years may be revalidated.**

Thesis

The plan of study for a master's degree may or may not include completion of a thesis. The thesis and non-thesis approaches are designed to meet the needs of students preparing for different types of careers and represent qualitatively different educational experiences. Consequently,

the academic departments and the Dean of the Graduate School discourage any switching from one plan to another. If a switch from a thesis to non-thesis plan is approved, the grade of *I* for the thesis work will be changed to *W* on the transcript with no refund of tuition for the course(s). At the time that the graduate program approves the student's thesis topic, the Petition for Topic Approval must be filed with the Graduate School. This form is available in the Graduate School and online at the Graduate School website.

The thesis should be submitted for final approval by the student's thesis committee at least three weeks before the date of the oral examination in which the thesis is defended. Following the successful completion of this defense, the master's candidate must submit three unbound copies of the approved and error-free thesis to the Graduate School no later than the filing date indicated in the University Calendar. Guidelines for the preparation of the thesis are available from the Graduate School and online at www.uncc.edu/gradmiss/manual.pdf.

Courses and Other Requirements

The courses and other requirements for specific degree programs are presented in each of their individual sections throughout this *Catalog*.

Ph.D. Degree Requirements

A doctoral degree is conferred by the University after the student has demonstrated outstanding scholarship in an approved program of study. Candidates must satisfy all University degree requirements in addition to all standards established by the doctoral faculty of their particular program. Specific program degree requirements are listed under the respective doctoral programs in this *Catalog*. In some cases, requirements in a given program are more stringent than the minimum requirements established by the Graduate School.

Ordinarily, a student must complete at least 72 post-baccalaureate credit hours in order to earn the Ph.D.

Advisory Committees

All students in graduate programs must have a graduate advisor who is a regular member of the Graduate Faculty in the student's major program. The graduate program coordinator/director appoints the graduate advisor.

For doctoral students, the committee will consist of at least four Graduate Faculty members, one of whom is appointed by the Dean of the Graduate School as the Graduate Faculty representative.

The committee for doctoral students is indicated on the Appointment of Doctoral Dissertation Committee form (available in the Graduate School office or on-line). At the time that the Appointment of Doctoral Dissertation Committee form is approved, the Graduate School appoints the Graduate Faculty Representative to serve on the doctoral committee.

Program of Study

Although the maximum amount of credit past the baccalaureate degree that a Ph.D. student may transfer towards a doctorate is 30 semester hours, only courses appropriate for the approved program and curriculum in which the student is enrolled may be transferred. Appropriate courses should be determined by the student's supervisory committee and approved by the program coordinator before the request is submitted to the Graduate School. This rule applies whether the courses were taken at UNC Charlotte or elsewhere and whether a master's degree was earned or not. However, no more than six hours taken when the student was in post-baccalaureate (non-degree seeking) status may be applied toward the doctoral degree.

Program Approval

By the end of the first semester of the third post-baccalaureate year in the program and no later than the filing of the petition to sit for the qualifying examination, a student's program of study must be approved by his or her advisory committee and submitted to the Dean of the Graduate School.

Course and Other Program Requirements

The course and other requirements for each degree program are indicated in the program descriptions in the following pages.

Time Limit

All courses beyond the master's degree, except transferred credit, that are listed on the candidacy form cannot be older than eight years at the time of graduation. Courses that exceed this time limit must be revalidated or retaken, whichever the graduate program decides necessary, if they are to count in a degree program.

To revalidate a course, the student, along with the program coordinator and the course instructor, prepare a revalidation plan that must be reviewed and approved by the Dean of the Graduate School. This plan often involves taking a special examination designed by the faculty of the graduate program.

Once the plan has been completed, the program coordinator must notify the Dean of the Graduate School in writing.

The Revalidation Form is available on the "Forms" page of the Graduate School website at www.uncc.edu/gradmiss/gs_forms.html.

Students may not revalidate courses with a grade of C or lower, courses that are internships or other forms of practica, or courses taken at other institutions. **Additionally, no more than 25% of the courses on a student's program of study may be revalidated, and no course older than ten years may be revalidated.**

Residence

All doctoral students are required to complete a substantial residency requirement during which they have sustained contact with the graduate faculty. This requirement is specified in the program descriptions.

Graduate Faculty Representative

The graduate faculty representative is a member of the doctoral student's advisory committee appointed by the Graduate School. This faculty member's role is primarily procedural. He/she must 1) assure that the doctoral student is treated fairly and impartially by his or her advisory committee, and 2) assure that University standards and policies are upheld. This representative is generally appointed prior to the student's dissertation proposal defense and must participate in the dissertation topic approval process and in the final dissertation examination. A student's advisor may consult with the Dean of the Graduate School regarding selection of this representative.

Qualifying Examination

Each student must complete a qualifying examination. Ordinarily students who enter a Ph.D. program directly from a baccalaureate program sit for this examination before the end of their third post-baccalaureate year in the program while students who enter a Ph.D. program from a master's degree program take the examination before the end of their first year in the doctoral program. To sit for this examination, the student must have at least a 3.0 GPA and must have removed any conditions upon admission.

Re-examination

A student who fails the qualifying examination may petition the program faculty to be re-examined. The re-examination may take place no sooner than the beginning of the semester following the one in which the failure occurred. A student who fails the qualifying examination a second time is terminated from the doctoral program.

Candidacy

The dissertation topic may be proposed after the student has passed the qualifying examination. A doctoral student advances to candidacy after the dissertation topic has been approved by the student's advisory committee and the Dean

of the Graduate School. Candidacy must be achieved at least six months before the degree is conferred.

Dissertation

The doctoral program of study must include 18 hours of research credit including dissertation credit. The doctoral candidate must be continuously enrolled in dissertation credit hours (Also see: *Student Responsibility - Continuous Registration*) beginning with the semester after the dissertation topic is approved until the semester of graduation.

It is generally expected that all dissertation committee members be physically present for the dissertation proposal defense and for the dissertation final defense. If there is an exceptional case in which one committee member needs to participate in the proposal or final defense from a remote location, the student and all committee members must assure that all the conditions listed on the Approval of Remote Committee Participation Form are met. (No more than one committee member may participate from a remote location.)

This form, which may be obtained from the Graduate School, must be completed and returned to the Graduate School at least two weeks prior to the scheduled proposal or final defense.

The dissertation must be submitted for final review by the student's committee at least three weeks before the date of the final examination in which the dissertation is defended. Following the successful completion of this defense, the doctoral candidate must submit four unbound copies or one electronic copy of the approved error-free manuscript to the Graduate School no later than the filing date indicated in the University calendar. Guidelines for the preparation of the dissertation are available from the Graduate School and online at www.uncc.edu/gradmiss/manual.pdf.

The Graduate School requires publication of the dissertation on microfilm and in *Dissertation Abstracts International* by University Microfilms International of Ann Arbor, Michigan. The student is responsible for paying the microfilming and optional copyrighting fees. Any other arrangements for publications of the dissertation must not interfere with publication by University Microfilms International.

Final Examination

Each candidate must pass a final examination over the contents of the dissertation. Sometimes called the "dissertation defense" or the "dissertation oral," this meeting is traditionally open to members of the University community. No student is permitted to take the final examination more than twice.

Application for Degree

Students should submit an Application for Degree at the beginning of the term in which they anticipate defending

their dissertation proposal. Adherence to Graduate School deadlines is expected. Degree requirements are completed when students successfully defend their dissertation and file the final copy of the dissertation in the Graduate School.

Ed.D. Degree Requirements

The Doctor of Education (Ed.D.) degree is conferred by the University after the student has successfully completed all requirements in an approved doctoral program of study in the College of Education. Specific program degree requirements are described in the College of Education section of this *Catalog*.

Program of Study

Although the maximum amount of credit past the Master's of School Administration (M.S.A.) degree that an Ed.D. student may count towards a doctorate is 9 semester hours, only educational administration courses approved by the program coordinator may be transferred. This rule applies whether the courses were taken at UNC Charlotte or elsewhere; however, no more than six hours taken when the student was in post-baccalaureate (non-degree seeking) status may be applied toward the doctoral degree.

Time Limit

All courses, including accepted transferred credit(s) that are listed on the candidacy form, cannot be older than eight years at the time of graduation. Courses that exceed this time limit must be revalidated or retaken, whichever the graduate program decides necessary, if they are to count in a degree program.

To revalidate a course, the student, along with the program coordinator and the course instructor, prepare a revalidation plan that must be reviewed and approved by the Dean of the Graduate School. This plan often involves taking a special examination designed by the faculty of the graduate program. Once the plan has been completed, the program coordinator must notify the Dean of the Graduate School in writing. The Revalidation Form is available on the "Forms" page of the Graduate School website at www.uncc.edu/gradmiss/gs_forms.html.

Students may not revalidate courses with a grade of *C* or lower, courses that are internships or other forms of practica, or courses taken at other institutions. **Additionally, no more than 25% of the courses on a student's program of study**

may be revalidated, and no course older than ten years may be revalidated.

Comprehensive Examination

Students are required to successfully pass a written and oral examination. The examination is based upon the core areas of educational leadership, educational research, and instructional technology.

Admission to Candidacy Requirements

Students are recommended for admission to candidacy after successfully completing the written and oral comprehensive examination.

Dissertation

Students must complete and defend a dissertation focused on a specific problem or question relevant to K-12 educational organizations, administration, or leadership. Students must be continually enrolled in ADMN 8999 (3 hrs) (fall, summer and spring sessions) for dissertation research credit, beginning with the semester following completion of the comprehensive examination and continuing through the semester of their graduation. Defense of their dissertation is conducted in a final oral examination that is open to members of the University community.

For doctoral students, the committee will consist of at least four Graduate Faculty members, one of whom is appointed by the Dean of the Graduate School as the Graduate Faculty representative.

The committee for doctoral students is indicated on the Appointment of Doctoral Dissertation Committee form (available in the Graduate School office or on-line). At the time that the Appointment of Doctoral Dissertation Committee form is approved, the Graduate School appoints the Graduate Faculty Representative to serve on the doctoral committee.

It is generally expected that all dissertation committee members be physically present for the dissertation proposal defense and for the dissertation final defense. If there is an exceptional case in which one committee member needs to participate in the proposal or final defense from a remote location, the student and all committee members must assure that all the conditions listed on the Approval of Remote Committee Participation Form are met. (No more than one committee member may participate from a remote location.) This form, which may be obtained from the Graduate School, must be completed and returned to the Graduate School at least two weeks prior to the scheduled proposal or final defense.

The dissertation must be submitted for final review by the student's committee at least three weeks before the date of the final examination in which the dissertation is defended.

Following the successful completion of this defense, the doctoral candidate must submit four unbound copies or one electronic copy of the approved error-free manuscript to the Graduate School no later than the filing date indicated in the University calendar. Guidelines for the preparation of the dissertation are available from the Graduate School and on the Graduate School Website.

The Graduate School requires publication of the dissertation on microfilm and in *Dissertation Abstracts International* by University Microfilms International of Ann Arbor, Michigan. The student is responsible for paying the microfilming and optional copyrighting fees. Any other arrangements for publications of the dissertation must not interfere with publication by University Microfilms International.

Graduate Faculty Representative

The graduate faculty representative is a member of the doctoral student's advisory committee appointed by the Graduate School. This faculty member's role is primarily procedural. He/she must 1) assure that the doctoral student is treated fairly and impartially by his or her advisory committee, and 2) assure that University standards and policies are upheld. This representative is generally appointed prior to the student's dissertation proposal defense and must participate in the dissertation topic approval process and in the final dissertation examination. A student's advisor may consult with the Dean of the Graduate School regarding selection of this representative.

Application for Degree

Students should submit an Application for Degree at the beginning of the term in which they anticipate defending their dissertation proposal. Adherence to Graduate School deadlines is expected. Degree requirements are completed when students successfully defend their dissertation and file the final copy of the dissertation in the Graduate School.

Graduate Certificate Requirements

The graduate certificate is awarded for successful completion of a coherent program of at least 12 credit hours proposed by a unit of the graduate faculty and approved by the Graduate Council. Students are admitted to a particular graduate certificate program and are advised by faculty in the unit offering the graduate certificate. Admission to a graduate certificate program is separate and distinct from admission to a graduate degree program. Admission to a certificate program is not an indication of subsequent admission to a

degree program just as admission to a degree program is not an indication of admission to a certificate program.

Since the graduate certificate is not a degree, students may apply the credits earned in the certificate program toward a single degree that they pursue either in conjunction with the graduate certificate or after the certificate has been awarded. However, students may not apply credits earned in one certificate program toward the satisfaction of requirements in a second certificate program.

Students may enroll in a graduate certificate program only or may complete the certificate in conjunction with a graduate degree program at the University. Hours taken toward a graduate certificate may be counted toward a graduate degree program with the recommendation of the graduate program coordinator and the approval of the Graduate School.

Graduate certificate programs generally require at least 12 credit hours of graduate course work. Up to six hours taken at post-baccalaureate status at UNC Charlotte may be applied toward a certificate with the recommendation of the program coordinator and the approval of the Graduate School. Students ordinarily may not transfer hours from another institution into a certificate program. The graduate certificate is awarded to a student who has completed the specified program of study with a GPA of 3.0 or better within four years from the time of enrollment in the first certificate course.

[Note: No Graduate Certificates will be awarded retroactively.]

Academic Records and Transcripts

The Office of the Registrar is responsible for maintaining the official academic records for all students. Upon written request by the student, an official transcript of the academic record will be issued to the person or institution designated, provided that all the student's obligations to the University have been settled satisfactorily.

A nominal fee per copy must accompany each request for a transcript. Requests should reach the Office of the Registrar at least one week before the date the transcript is needed. Students may request an official transcript through the secure student access pages of self service via 49er Express found online at www.express.uncc.edu or complete a request form available at www.registrar.uncc.edu/forms/transcript.pdf.

Currently, the Office of the Registrar cannot accept requests via email.

Family Educational Rights and Privacy Act (FERPA) Notification

The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records. They are:

- 1) The right to inspect and review the student's education records within 45 days of the day the University receives a request for access.

Students should submit to the Office of the Registrar, dean of their college, chair of their major academic department, or other appropriate official written requests that identify the record(s) they wish to inspect. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

- 2) The right to request amendment of the student's education records that the student believes are inaccurate or misleading.

Students may ask the University to amend a record that they believe is inaccurate or misleading. They should write the University official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate or misleading.

If the University decides not to amend the record as requested by the student, the University will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

- 3) The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

One exception that permits disclosure without consent is disclosure to school officials with legitimate educational interests. A school official is a person employed by the University in an administrative, supervisory, academic, research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks.

A school official has legitimate educational interest if the official needs to review an education record in order to fulfill his/her professional responsibility.

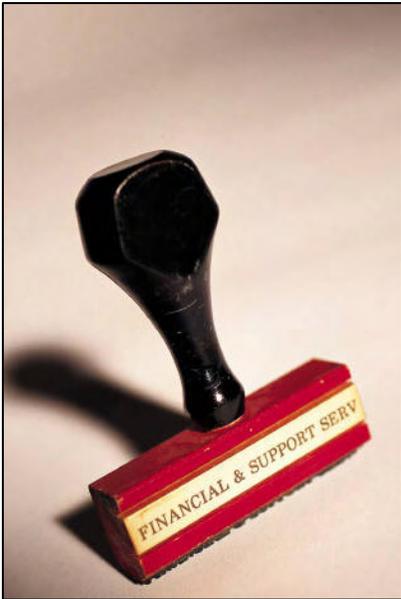
- 4) The right to file a complaint with the U.S. Department of Education concerning alleged failures by UNC Charlotte to comply with the requirements of FERPA. The Office that administers FERPA is: Family Policy Compliance Office, U.S. Department of Education, 600 Independence Avenue, SW, Washington, DC, 20202.

UNC Charlotte intends to comply fully with these requirements. Policy Statement No. 69, "Student Records," explains the procedures for compliance. Students may obtain copies of the policy in the Office of the Registrar or online at www.legal.uncc.edu/policies/ps-69.html. The policy includes a list of the locations of all education records maintained by the institution.

The following categories of personally identifiable information about students have been designated as public or directory information that may be disclosed for any purpose without student consent: name, local and permanent address, telephone number, email address, date and place of birth, class, major field of study, dates of attendance, enrollment status, degrees and awards (including scholarships) received, participation in officially recognized activities and sports, weight and height of members of an athletic team, and the most recent previous educational agency or institution attended.

Currently enrolled students may request that the University withhold disclosure of Directory Information by completing the appropriate form available in the Office of the Registrar. A request for non-disclosure will be honored by the University indefinitely, unless the student submits to the Office of the Registrar a written revocation of such request for non-disclosure.

All questions concerning this policy on educational records may be directed to the attention of the Office of the Registrar.



Financial Information

www.studentaccounts.uncc.edu

Student Expenses and Fees

Charges for tuition and fees vary according to the student's status as a resident or nonresident of North Carolina. A nonresident student pays a higher rate of tuition than a legal resident.

The University reserves the right, with the approval of proper authorities, to make changes in tuition and fees at any time. The University also reserves the right to correct any clerical errors on a student's account. For the most current listing of tuition and fees at The University of North Carolina at Charlotte, please visit www.studentaccounts.uncc.edu.

Student Expenses

Graduate students taking nine or more semester hours and undergraduate students taking twelve or more semester hours during a regular semester will be charged full tuition and fees. Students taking fewer than the nine hours for graduate study and twelve hours for undergraduate study will be charged a prorated portion of tuition and fees as specified in the fee schedules in this *Catalog*.

Fee Payment

Tuition and fees are due and payable by the date specified on the bill. Billing statements (eBill) will be issued monthly and can be viewed online by logging on to 49er Express. The email notifications will be issued to a student's UNC Charlotte email account when there is a balance due to the University. Checks and money orders should be made payable to UNC Charlotte, please include the student's ID number. Visa, MasterCard, and

American Express are accepted. Payments by credit card may be made online through 49er Express.

UNC Charlotte offers payment plans each Fall and Spring term which allow you to spread your tuition and fees, on-campus housing and dining, and other charges billed to your student account into several smaller payments. Log on to 49er Express and select the payment plan option that best meets your needs. Payment plan options and additional information can be found online at <http://studentaccounts.uncc.edu/PaymentPlanOption.html>.

Returned Check Policy

If a check is returned by the bank, a letter is sent to the maker indicating that a penalty of \$25 has been assessed and the account must be settled within 10 working days or the check will be considered to be a bad check and be processed accordingly. A hold will be placed on the student's record until the bad check is covered and the penalty is paid.

A student who pays a previous balance with a check in order to have a registration hold flag lifted will have their registration cancelled if the check is returned by the bank for any reason.

Residence Status For Tuition Purposes

Tuition charges are based upon classification of a student as a resident or a nonresident of North Carolina for tuition purposes. UNC Charlotte shall determine whether a student is a resident or a nonresident for tuition purposes in accordance with North Carolina General Statutes that are summarized below. A more complete explanation of the statute and the procedures are contained in *A Manual to Assist the Public Higher Education Institutions of North Carolina in the Matter of Student Residence Classification for*

Tuition Purposes. Copies of the Manual are available for inspection in the Library and the admitting offices.

Residence. Generally, in order to qualify as a resident for tuition purposes, a person must be a legal resident of North Carolina AND must have been domiciled in North Carolina for at least twelve (12) months immediately prior to classification as a resident for tuition purposes. In order to be eligible for such classification, the person must establish that his or her presence in the state during such twelve-month period was for purposes of maintaining a bona fide domicile rather than for purposes of mere temporary residence incident to enrollment in an institution of higher education. Legal residence is accomplished by maintaining a bona fide domicile of indefinite duration as opposed to maintaining a mere temporary residence incident to enrollment at an institution of higher education.

Initiative and Proof of Status. A student is responsible for seeking classification as a resident for tuition purposes. A student must (1) provide all of the information UNC Charlotte requires for consideration of residence classification and (2) establish facts that justify classification as a resident for tuition purposes.

Parents' Domicile. If a dependent student has living parents(s) or a court-appointed guardian who maintain bona fide domicile in North Carolina, this fact shall be prima facie evidence that the student is also domiciled in North Carolina. **This primary proof of the student's legal residence may be supported or rebutted by other information.**

If a student's parent(s) or guardian are domiciled outside of North Carolina, this fact shall be prima facie evidence that the student is also not domiciled in North Carolina, unless the student has lived in North Carolina for the five years preceding enrollment or re-registration at UNC Charlotte.

Effect of Marriage. A person does not automatically obtain North Carolina domicile solely by marrying a North Carolina resident. If both spouses have established a North Carolina domicile and one spouse has been a domiciliary longer than the other, the member of the couple who has the shorter duration of domicile may borrow his/her spouse's duration of domicile to meet the 12-month requirement. However, the two durations cannot be added together to meet the 12-month requirement.

Teacher Tuition Benefit. According to North Carolina General Statute 116-143.5, public school teachers and other personnel paid on the North Carolina teacher salary schedule who have established a legal residence (domicile) in North Carolina, but have maintained the domicile for less than twelve months, may be eligible to receive a waiver of the tuition difference between out-of-state and in-state

tuition for courses relevant to teacher licensure or professional development as a teacher. If you believe you are eligible for this benefit, you must complete the entire North Carolina Residence and Tuition Status Application and provide supporting documentation for each semester that you wish to be considered for this benefit.

Military Personnel. A North Carolinian who serves outside the State in the armed forces does not lose North Carolina domicile and thus North Carolina legal residence simply by reason of such service. Students in the military may prove retention or establishment of legal residence by reference to residency acts accompanied by residency intent.

In addition, North Carolina General Statutes provide tuition rate benefits to certain military personnel and their dependents who do not otherwise qualify for the in-state tuition rate. Members of the armed services, while stationed in and concurrently living in North Carolina, may be charged a tuition rate lower than the out-of-state tuition rate to the extent that the total of entitlements for applicable tuition costs available from the federal government, plus certain amounts calculated by reference to a North Carolina statutory formula, is a sum less than the out-of-state tuition rate for the applicable enrollment.

A dependent relative of a service member stationed in North Carolina shall be charged the in-state tuition rate while the dependent relative is living in North Carolina with the service member. Under this provision, the dependent relative must comply with any applicable requirements of the Selective Service System.

Tuition benefits based on military service may be enjoyed only if requirements for admission to UNC Charlotte have been met. The military service tuition statute does not qualify a person for or provide the basis for receiving derivative benefits under other tuition statutes.

Non-United States Citizens. If you are not a U.S. citizen, you may or may not qualify for resident tuition status on the same basis as a U.S. citizen; it depends upon the type of immigration or legal documents you hold. You may qualify if you are a permanent resident alien, a refugee, a parolee, or an asylee. You do not qualify if you hold one of the following visa or status - - B, C, D, F, J, M, P, Q, S.

If you later receive permanent resident alien status or a visa/status that allows you to qualify for resident tuition status, you must establish North Carolina domicile and wait 12 months. If you have applied for permanent resident alien status, but it has not been granted yet, you are still considered as being in the country under the visa or document that you had before you applied for permanent resident status (aka "green card").

Grace Period. If a student (1) is a legal resident of North Carolina, (2) has consequently been classified a resident for tuition purposes, and (3) has subsequently lost North Carolina legal residence while enrolled at UNC Charlotte, the student may continue to enjoy the in-state tuition rate for a grace period of 12 months measured from the date the student lost his or her status as a legal resident. If the 12 month grace period ends during an academic term in which the student is enrolled at UNC Charlotte, the grace period extends to the end of that term. Marriage to one domiciled outside of North Carolina does not, by itself, cause loss of legal residence, marking the beginning of the grace period.

Lost but Regained Legal Residence. If a student ceases enrollment at or graduates from UNC Charlotte while classified as a resident for tuition purposes and then abandons and reestablishes North Carolina legal residence within a 12-month period, that student shall be permitted to re-enroll at UNC Charlotte as a resident for tuition purposes without meeting the 12-month durational requirement. Under this provision, the student maintains the reestablished legal residence through the beginning of the academic term for which in-state tuition status is sought. A student may receive the benefit of this provision only once.

Change of Status. A student accepted for initial enrollment at UNC Charlotte or permitted to re-enroll following an absence from the institutional program that involved a formal withdrawal from enrollment will be classified by the admitting institution either as a resident or as a nonresident for tuition purposes prior to actual enrollment. A residence status classification once assigned (and finalized pursuant to any appeal properly taken) may be changed thereafter (with corresponding change in billing rates) only at intervals corresponding with the established primary divisions of the academic year.

Transfer Students. When a student transfers from one institution of higher education to another, he or she is treated as a new student and must be assigned an initial residence classification for tuition purposes.

Appeal Procedure. A newly admitted student or continuing student who has been classified as a non-resident for tuition purposes by the Graduate School may appeal the decision to the Graduate Residency Appeals Committee. This request must be in writing to the UNC Charlotte Graduate Residency Coordinator and must be submitted within ten days from the date of the issuance of the letter of determination. The request may consist simply of the statement, "I wish to appeal the decision as to my residence classification for tuition purposes." It must be dated and signed and should indicate the applicant's UNC Charlotte student identification number and mailing address. If the Graduate Residency Appeals Committee

determines that you are not a resident for tuition purposes, you may appeal that decision to the University of North Carolina: Office of the President.

Academic Common Market

The Academic Common Market (UNC-ACM) is a cooperative tuition-reduction agreement among 16 states that participate in the Southern Regional Education Board (SREB): Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. Under this program, qualified students from states outside North Carolina may apply through their own state's ACM coordinator for reduced tuition rates at UNC Charlotte while pursuing programs that are neither in their home state's university system nor commonly available in other SREB states. In essence, qualified students are considered "in-state" residents during the time they are pursuing their specified degree program, therefore making them eligible for reduced tuition rates and other opportunities afforded residents who attend the institution. For more detailed information about the application process, including an ACM contact in each of the participating states, see the UNC-ACM website at <https://acm.rti.org>.

TUITION AND FEES PER SEMESTER

Following are the tuition and mandatory fees that were authorized for 2008-2009. (At press time, the tuition and fees for 2009-2010 had not yet been released.) The University reserves the right, with the approval of the appropriate authorities, to make changes in tuition and/or fees at any time.

Ed & Tech Fee – This fee is directly related to the infrastructure supporting student technology needs across campus including hardware and software applications, supplies for educational materials, web services, laboratory expenses and equipment, public student computing labs, central email and internet services, training classes and classroom, and central help desk services.

General Fees – This is a consolidated fee that relates to University debt service payments (to construct new facilities and purchase administrative computing systems) and to support other activities/operations including Athletics programs and events, the Health Services Center that serves our student population, Student Activity Center operations, and Cone Center operations.

ID fee – This fee supports the University's 49er Card operations and support. The ID card is not only used for identification purposes, but also as a library card and as a campus card for dining and vending purchases.

UNC System Student Assoc Fee – This fee is a University of NC system-wide fee charged to all system students to support the University Of NC Association Of Student Governments. This association is a student led advocacy group whose main purpose is to ensure that the benefits of the University of NC are extended to the people of NC, as far as practicable, free of expense.

Transportation Fee – This fee helps to fund the campus transportation shuttle system which operates during the fall and spring semesters. The shuttle serves to provide the UNC Charlotte campus with efficient and safe campus transportation, reduce vehicular congestion and decrease the demand for proximity parking.

GRADUATE RESIDENTS				
	0-2 Credit Hours	3-5 Credit Hours	6-8 Credit Hours	9+ Credit Hours
Tuition	365.00	729.75	1094.75	1459.50
Ed & Tech Fee	34.25	34.25	64.50	129.00
General Fee	228.50	228.50	752.50	746.00
ID Fee	4.25	4.25	4.25	4.25
Transportation Services Fee	3.00	3.00	3.00	3.00
UNC System Assoc Fee	0.15	0.15	0.50	0.50
Total Cost	635.15	999.90	1617.25	2342.25

GRADUATE NON-RESIDENTS				
	0-2 Credit Hours	3-5 Credit Hours	6-8 Credit Hours	9+ Credit Hours
Tuition	1640.75	3281.50	4922.25	6563.00
Ed & Tech Fee	34.25	34.25	64.50	129.00
General Fee	228.50	228.50	752.50	746.00
ID Fee	4.25	4.25	4.25	4.25
Transportation Services Fee	3.00	3.00	3.00	3.00
UNC System Assoc Fee	0.15	0.15	0.50	0.50
Total Cost	1910.90	3551.65	5444.75	7445.75

COLLEGE OF BUSINESS GRADUATE RESIDENTS				
	0-2 Credit Hours	3-5 Credit Hours	6-8 Credit Hours	9+ Credit Hours
Tuition	365.00	729.75	1094.75	1459.50
COB Master Increment	312.50	623.00	937.50	1250.00
Ed & Tech Fee	34.25	34.25	64.50	129.00
General Fee	228.50	228.50	752.50	746.00
ID Fee	4.25	4.25	4.25	4.25
Transportation Services Fee	3.00	3.00	3.00	3.00
UNC System Assoc Fee	0.15	0.15	0.50	0.50
Total Cost	947.65	1624.90	2554.75	3592.25

COLLEGE OF BUSINESS GRADUATE NON-RESIDENTS				
	0-2 Credit Hours	3-5 Credit Hours	6-8 Credit Hours	9+ Credit Hours
Tuition	1640.75	3281.50	4922.25	6563.00
COB Master Increment	312.50	623.00	937.50	1250.00
Ed & Tech Fee	34.25	34.25	64.50	129.00
General Fee	228.50	228.50	752.50	746.00
ID Fee	4.25	4.25	4.25	4.25
Transportation Services Fee	3.00	3.00	3.00	3.00
UNC System Assoc Fee	0.15	0.15	0.50	0.50
Total Cost	2223.40	4176.65	6382.25	8695.75

Shared Residence Hall space is **not** available to married students and/or their family members. The below figures were **2008-2009** prices and plans per semester. *Prices and plans are subject to change. Rates include: rent, all utilities, local phone service, cable TV service, The Miner Movies Channel, an Internet connection charge, and membership in the Resident Students Association (RSA Fee).*

Updated pricing can be found online at:
www.housing.uncc.edu/assignments/asg_rates.htm.

HOUSING PER SEMESTER	
Type	Fee
Apartment	\$2085-2506
Greek Village	\$2571
Highrise/Residence Hall – Double Room	\$1643
Highrise/Residence Hall – Single Room (if available)	\$2391

Suite	\$1996-2406
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Housing Deposit. Admission to UNC Charlotte does not guarantee residence hall space. Arrangements for on-campus housing are made, after admission, with the Director of Housing and Residence Life. Residence Hall space is not available to families or children of enrolled students.

A \$200 deposit must be submitted with all housing contracts. The deposit is not applied toward payment of fees. It is refunded only after the student has left on-campus housing and only if the student has met all financial obligations to the University. In the case of contract cancellation, the date of receipt of the written request for cancellation will determine, in part, the student's financial obligation to the University (please see the Housing Contract for the current academic year for specific cancellation dates).

During the 2008-2009 academic year, the following meal plans were available. *Prices and plans are subject to change.* Updated pricing and additional information can be found online at:
www.auxiliary.uncc.edu/dining/MealPlan.htm.

DINING SERVICES PER SEMESTER	
Meal Plans Available to All Students	Cost Per Semester
14 meals per week with \$200 declining balance	\$1585
12 meals per week with \$300 declining balance	\$1685
10 meals per week with \$400 declining balance	\$1685
150 block plan (any 150 meals during the semester) with \$100 declining balance	\$1345
Meal Plans Available to Any Upperclassman or Commuters	Cost Per Semester
125 block plan (any 125 meals during the semester) with \$175 declining balance	\$1280
Declining Balance Account of \$1505 or \$1065	\$1505 or \$1065
Meal Plan for On-Campus Apartment Rentals, Greek Village Residents, and Commuters Only	Cost Per Semester
Declining balance account value of \$500	\$500

Any student may purchase or add additional **Optional Dining Account** funds to their 49er ID card. The Optional Dining Account is similar to the Declining Balance Meal Plan in that it is accepted as payment in all campus dining facilities and on-campus convenience stores and saves its users the 8.25% sales tax. This account is open to students, faculty and staff on campus. Customers using the Optional Dining Account at the concession

counters during University sporting events are given a discount on their purchases. The Optional Dining Account can even be used to purchase catering services. Account balances can be checked or have funds added to it by visiting the 49er Card Office, located in the Auxiliary Services Building, or in the ID/Dining Services Office, located in the Cone University Center, or online at <https://uncc49ercard.blackboard.com>.

Special Assessments. During the academic year of 2008-2009, the following special assessments were charged to cover the cost of supplies or special materials:

SPECIAL ASSESSMENTS PER SEMESTER	
Type	Fee
Administrative Cancellation Fee	\$75
College of Arts + Architecture Student Fee	\$40
College of Computing & Informatics Student Fee	
1-7 hours	\$38
8 hours or more	\$75
College of Engineering Student Fee	
1-7 hours	\$50
8 hours or more	\$100
Nursing Course (Evolve/HESI test) Fee (NURS 3240 and 4450)	\$45
Scuba Diving (EXER 2219)	\$60
Advanced Scuba Diving (EXER 2220)	\$35
Applied Music Fee (1 credit hour)	\$45
Applied Music Fee (2 credit hours)	\$90
Co-op/49ership Fee (per semester of co-op enrollment)	\$60
International Student Fee (Visa type F or J)	\$50

Application Fee. A \$55 application fee must be submitted with the application for admission. The fee is not deductible and is not refundable.

Graduation Fee. Each member of the graduating class is automatically charged a graduation fee of \$57 for each degree and/or certificate at the time he/she applies for the degree. (*Note: If a student needs to change his/her graduation for any reason to a subsequent semester, the student must resubmit an application for degree and/or certificate. However, the student will not be required to re-pay the graduation fee.*) This fee includes the cost of the diploma/certificate, the cap and gown, and the hood for graduate degree students. No reduction of the fee is allowed for those receiving degrees in *Absentia*. (*Note: These fees are subject to change. Please see the Graduate School website at www.uncc.edu/gradmiss/c_graduation.html for the most recent graduation fee.*)

Credit By Examination Fee. Fees for credit by examination are as follows: A written examination for a course will require a fee of \$15. A laboratory examination requiring the arrangement of such things as laboratory materials will require a fee of \$25. A combination of a laboratory and written examination will require a fee of \$30.

Motor Vehicle Registration Fees

Students attending UNC Charlotte are required to register their motor vehicle(s) in order to park on campus; there is no free parking. Vehicle registration for fall and spring semesters is available online. Students may check the Parking & Transportation Services website for updates or changes to this policy. Payment must be received before the permit is issued or mailed. **Permits are required beginning at 8 a.m. on the first day of classes.** For students, two categories of permits are issued: *Resident* (for students living on-campus) and *Commuter* (for students living off-campus).

Permits sold in August are good for one year. Students who graduate in December may return their parking permit for a pro-rated refund. The price of the permit is the same for faculty, staff and students. For 2008-2009 the annual rate for a resident or commuter student was \$295. **Please reference www.parking.uncc.edu for current fees for your academic year.** Parking Services receives no state funding; therefore, parking fees are used to defray construction and operating expenses.

Night permits, valid only after 3 p.m., are sold at a reduced rate using the same schedule as the regular student permits. Students with night permits who come on campus before that time must park and pay at the meters or in visitors' spaces.

Penalties for Parking Violations. Violators of University parking regulations are subject to monetary penalties ranging from \$10 to \$100, depending on the severity of the violation. Copies of parking regulations are distributed with the parking permit. Additionally, citations enforced and penalties assessed can be found online at www.parking.uncc.edu/cit.htm. If a citation is not paid or appealed within 10 days, the penalty will be applied to the student's account with the University. Subsequent registration may be withheld for non-payment. Parking citations are issued 24 hours a day. Permits and meters are enforced from 8 a.m. until midnight, Monday through Thursday, and from 8 a.m. until 3 p.m. on Friday.

Questions concerning parking on campus should be directed to Parking & Transportation Services at 704-687-4285, 8 a.m. - 5 p.m., Monday through Friday. Emergency situations and questions at other times should be directed to the Campus Police at 704-687-2200.

REFUNDS

Tuition and Fees Refunds

A student who officially withdraws (from all classes) from the University in the fall or spring semester will receive a refund as follows:

TUITION AND FEES REFUNDS	
Period of Withdrawal	Percent of Tuition and Fees Refunded
Before 1 st Class Day	100%
Period 1*	100% minus \$25 withdrawal fee
Period 2*	100% minus \$75 withdrawal fee
Period 3*	80%
Period 4*	75%
Period 5*	70%
Period 6*	60%
Period 7*	55%
Period 8*	50%
Period 9*	40%
After Last Period*	0%

**Generally, each period is one week in length; however, for specific dates of each period, please visit the Refunds Schedule online at <http://studentaccounts.uncc.edu/refunds.html>.*

Summer School. Summer School refund schedules are reviewed and revised annually based upon the Summer School calendar. See www.summer.uncc.edu for the refund schedule for the current sessions.

Exceptions. Charges are refundable by administrative action on a prorated basis for the unexpired portion of the term for the following reasons: death of the student, withdrawal for adequate medical reason as certified by the University Student Health Center or family doctor, death in the immediate family that necessitates student withdrawal, and dismissal or suspension from school. Immediate family is defined as wife, husband, parent, child, brother, sister, grandparent, and grandchildren and includes step-, half- and in-law relationships. Appropriate documentation must be submitted to the Dean of Students.

No refunds will be given to students who are withdrawn by administrative action for failure to comply with the North Carolina immunization laws.

Appeal Procedure. Sometimes a student experiences extenuating circumstances that warrants consideration of a refund. The *Appeal for Tuition, Housing, and Dining Refund Form* can be found online at www.finance.uncc.edu/Forms/THDAppealform.doc. The Registrar's Office, Student Account's Office, Housing, and other offices must then research the request thoroughly. In

some cases, the appeal for a refund must be forwarded to the Tuition, Housing, and Dining Appeals Committee. If the request must be forwarded to the Committee, the student will be notified of the date and time of the meeting and offered the option to present the request in person. Once a decision has been made regarding the appeal, the student will be notified by mail.

The contract period for academic-year housing contracts is the entire academic year (Fall and Spring semesters). The student and/or guarantor agree to pay the full amount of charges for residential services. To cancel residential services, the student and/or guarantor must send a signed written request for cancellation of the contract to the Housing and Residence Life Office or submit a request online at www.housing.uncc.edu. The date of receipt of the written request for cancellation will determine, in part, the student's financial obligation to the University (please see the Housing Contract for the current academic year for specific cancellation dates). If, during the time of the Contract, the student loses the right to live in University housing by reason of disciplinary action, or breach of the Contract, no refund of housing charges for the term will be made.

Summer School. The contract period for Summer School coincides with each term of the Summer School calendar; housing charges are refundable based upon the number of weeks of occupancy.

Financial Aid

UNC Charlotte administers financial aid without regard to race, color, national origin, religion, gender, sexual orientation, age, or disability.

The University offers a comprehensive program of student financial aid (scholarships, fellowships, grants, loans, and part-time employment) to assist graduate students in meeting educational expenses. Reasonable educational expenses include tuition and fees, room and board, books, supplies, transportation, miscellaneous personal expenses, and expenses related to maintenance of a student's dependents. Details can be found at www.finaid.uncc.edu.

Eligibility

The programs of student financial aid are administered according to a nationally accepted policy that the family, meaning parents (or those acting in place of parents) and/or spouse, is responsible for a student's educational expenses. Therefore, eligibility for financial aid will be determined by a comparison of a budget (educational expenses as defined above) for the period of attendance with what the student's family can reasonably be expected to contribute.

A financial aid applicant will be considered for available assistance for which he/she is eligible if the student:

- Completes the application process and related forms only after thoroughly reading all instructions.
- Completes the admission application process and is accepted for enrollment at UNC Charlotte.
- Is working toward a degree or certificate and not simply taking courses.

Application Process

To apply for the following programs, a student must complete the Free Application for Federal Student Aid online at www.fafsa.ed.gov.

- Federal Stafford Student Loans
- Federal Graduate PLUS Loans
- Federal Perkins Loan
- Federal Work Study
- University Grants
- University Loans
- University Need-based Scholarships

Renewal Process

Renewal of financial aid is based upon a student's making satisfactory academic progress. The Free Application for Federal Student Aid is required each year that a student applies for financial aid.

FINANCIAL AID PROGRAMS

Loans

Federal Perkins Loan--Loans of up to \$5,500 per year are made to students with the highest financial needs who apply by the University's established priority date of April 1. The interest rate is 5.0% with repayment beginning nine months after graduation.

Federal Stafford Loans -- Qualified graduate students may borrow up to \$20,500 per year but cannot exceed reasonable educational expenses. The interest rate for new loans is currently 6.0%, and repayment begins six months after the borrower ceases to be a student.

Federal Graduate PLUS Loans -- These loans are federally sponsored loans for students attending graduate school. With a Grad PLUS loan, you may borrow up to the full cost of your education, less other financial aid received including Federal Stafford loans. The current fixed interest rate is 8.5% and a credit check is required.

Short-Term Emergency Loans -- Students may borrow up to \$300 for unanticipated expenses that occur during the semester and up to \$1,000 for tuition expenses. Loans have no interest and must be repaid within 30 to 60 days.

Funds for these loans are provided by private donation and are limited.

Grants

UNC Charlotte Grants -- UNC Charlotte administers a need-based grant program that is available to graduate students called the Tuition Assistance Grant. To be considered, a student must apply by the established priority date of April 1 by completing the Free Application for Federal Student Aid (FAFSA) online at www.fafsa.ed.gov.

GRADUATE FINANCIAL ASSISTANCE PROGRAMS

The programs described below are administered by the Graduate School of the University and *do not require the completion of the federal FAFSA*. To be considered for these awards, students must be nominated by their academic department. Awards may consist of tuition assistance, health insurance grants, assistantships, and/or fellowships.

Tuition and Health Insurance Grants

Resident Tuition Awards -- There are a limited number of grants available for North Carolina residents to assist with tuition. These are for students of high merit. Students should contact their graduate coordinator about application procedures.

Graduate Assistant Support Plan -- The Graduate Assistant Support Plan (GASP) is a highly competitive support package used to attract top graduate students to UNC Charlotte. To be considered for GASP awards, students must be supported on a teaching or research assistantship or a fellowship of at least \$666.67 per month and meet minimum registration requirements. Currently, PhD students with GASP awards receive full tuition and health insurance benefits, and Masters non-resident students receive partial tuition awards.

Graduate Assistantships

Graduate assistantships provide students with financial aid and valuable experience in administration, teaching, and research related to their academic endeavors.

To be eligible for appointment as a graduate assistant, a student:

- must have a baccalaureate degree, or a baccalaureate degree and work experience, that equips them for the assignment;
- must have been admitted to full standing in a graduate degree program; and
- must have had an undergraduate grade point average of at least 3.0 or better overall; or must have

completed at least six hours of graduate work with a GPA of 3.0 or better.

To retain their appointments, graduate assistants must maintain appropriate enrollment, register for at least 6 or 9 graduate-level hours each semester as determined by the requirements of the appointment, make satisfactory progress toward their degrees, maintain a minimum 3.0 GPA, and perform their assigned duties satisfactorily. It is expected that graduate assistants will work no more than twenty hours per week in the assistantship and any other employment on or off campus.

Assistantships are available in most graduate degree programs and through some administrative offices. To apply, students should complete the Application for Graduate Assistantship (available from the Graduate School or online at www.uncc.edu/gradmiss/AsstAppl.pdf) and submit it to the department or degree program in the semester preceding the term for which the assistantship is sought.

Fellowships/Scholarships

While these awards are administered by the Graduate School, in nearly all cases, the individual graduate programs must determine student eligibility and submit nominations to the Graduate School. However, if you are interested in any particular competition or have questions regarding eligibility requirements, deadlines, and nomination procedures, please contact the Assistant Dean of the Graduate School.

Everett Foundation First Year Graduate Fellowship

These first-year fellowships provide stipends of \$15,000 and \$10,000 plus tuition awards to one newly admitted doctoral student and one newly admitted master's student respectively for their first year of study at UNC Charlotte. In addition, Everett Fellows are provided full tuition and health insurance for the normal length of their academic program.

Wayland H. Cato Fellowships

The Cato Fellowship provides a one-year stipend of \$18,000 for two newly admitted Ph.D. students (any field of study) and may be renewed for the normal length of the academic program so long as the student continues in good standing. In addition, Cato Fellows are provided full tuition, fees, and health insurance grants.

McNair Graduate Fellowship

This award is a stipend supplement to a departmental Teaching or Research Assistantship for up to \$3,000 per year for 2 years. Students must be enrolled full-time in a doctoral program and have been a McNair Scholar at their undergraduate institution.

Joanna R. Baker Memorial Graduate Fellowship

Endowed through the generous gifts of the many friends of Dr. Joanna Baker, this fellowship will award \$1,000 to a graduate student who has a commitment to a career that will apply information technology to problem solving in the public sector (e.g., criminal justice, health care, government).

John Paul Lucas, Jr. Scholarship

This is an award given each spring semester to a student who has been teaching and wishes to pursue a graduate degree in English in the College of Liberal Arts & Sciences or College of Education.

The Robert J. Mundt Memorial Scholarship for International Study

Stipends are available to defray the costs associated with a study abroad experience. All full-time graduate and undergraduate UNC Charlotte students are eligible. Applications are available in the Office of Education Abroad in Room 114 Denny.

Edward Giles Dissertation-Year Fellowships

Stipends are available to doctoral students from donations made to the University by the Giles family. These awards are usually given in addition to a graduate assistantship.

Graduate Life Fellowships

The Graduate Life Fellowship provides a stipend of \$4000 per year to four to six students annually. Recipients agree to participate in creative programming that supports the graduate student community of the University.

The Zonta Club

The Zonta Club award is given annually to an undergraduate or graduate student who is continuing a university education after considerable time away from formal education. This award covers the cost of one year's in-state tuition.

UNC Campus Scholarships

Funding for this program is provided by the General Assembly of North Carolina to each constituent institution of the UNC system. These awards are for North Carolina residents only. These limited awards are provided to doctoral students with exceptional financial need who are recommended by the graduate coordinator of the academic program in which they plan to enroll.

National Fellowships

These awards are made to an individual rather than to the University. Recipients are chosen through competitions expressive of the terms of each award. Some examples of these awards are listed below. Contact the graduate program coordinator to discuss available fellowship programs in a specific field.

- National Science Foundation (NSF) Graduate Research Fellowship
- Ford Foundation Predoctoral Diversity Fellowship
- Department of Defense National Defense Science and Engineering Graduate Fellowship (DODNDSEG)
- Department of Energy Computational Science Graduate Fellowship
- NASA Graduate Student Researchers Program – Underrepresented Minority Focus Award
- National Consortium for Graduate Degrees for Minorities in Engineering Inc. (GEM) Fellowship
- National Physical Science Consortium – open to all U.S. citizens but with an emphasis on underrepresented minorities and women in the Physical Sciences

In addition to the fellowships and scholarships mentioned above, a number of the graduate programs have scholarships and/or assistantships available. Please contact the individual units for specific information.

EMPLOYMENT ON- AND OFF-CAMPUS

Please see the University Career Center in the “Student Resources and Services” section later in this *Catalog* for details.

EDUCATION FOR THE VOCATIONALLY DISABLED

Vocationally disabled students are eligible for aid provided by the North Carolina State Division of Vocational Rehabilitation. This aid takes the form of services that include vocational counseling and guidance and placement. Payment of expenses such as training, medical treatment, room and board, books, fees, and tuition may be available. A vocational rehabilitation officer is available in Charlotte for interviewing applicants. Appointments may be made by contacting Vocational Rehabilitation Services at 704-568-8804. Their offices are located at 5501 Executive Center Drive in Charlotte.

VETERANS BENEFITS

UNC Charlotte's Veterans Service Office (VSO), located in the Office of the Registrar, works with the Veterans Administration to assist in administering the various programs of benefit to veterans or eligible relatives of veterans. The VSO Certifying Official certifies enrollment and transmits necessary credentials and information to the proper Veterans Administrative Office.

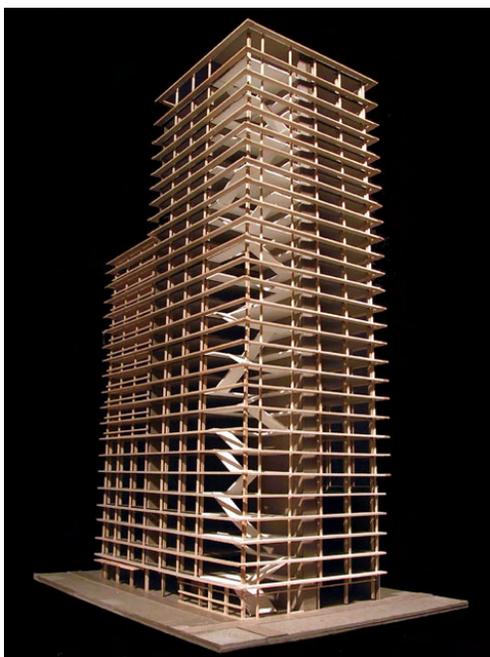
Admission to the University should be obtained before the student makes application for veteran's benefits. Applicants must be accepted into a degree program to receive benefits.

In order to be eligible for the full monthly allowance under any of the above laws, an undergraduate student must be enrolled for 12 or more semester hours and a graduate student must be enrolled for nine or more semester hours. Those enrolled on a part-time basis will be eligible for part time compensation. Students are responsible for reporting any change in enrollment status to the VSO Certifying Official.

For details about available programs, please visit www.registrar.uncc.edu/VA or call the VA's toll-free number at 1-800-827-1000.

Children of Veterans. The North Carolina Department of Veterans Affairs awards scholarships for the children of certain deceased or disabled veterans. Those awarded "full" scholarships are entitled to tuition, mandatory fees, board allowance, and room allowance; those awarded "limited" scholarships are entitled to tuition and mandatory fees. Written requests for benefits information may be directed to: VA Atlanta Regional Office, Post Office Box 100022, Decatur, GA 30031-7002 (telephone 888-442-4551).

Before the time of registration, each eligible student who wishes to enter the University should: (1) apply for admission following University procedures and (2) apply for a scholarship award to the North Carolina Department of Veterans Affairs.



College of Arts + Architecture

www.coaa.uncc.edu

Dean: Kenneth Lambla
Associate Dean: Lee Gray

The College of Arts + Architecture consists of one school and four departments (School of Architecture and the Departments of Art and Art History, Dance, Music, and Theatre), which share basic educational values and academic aspirations. At the graduate level, the College offers the Master of Architecture, Master of Urban Design, and North Carolina K-12 teacher licensure graduate degree programs in Art, Dance, Music, and Theatre (*see the College of Education section in this Catalog for details.*)

The primary mission of the College is to provide programs that prepare graduates for careers as architects, urban designers, artists, leaders, cultural administrators, and innovators in our emerging creative economy. The College draws together in a single academic unit disciplines with common histories, methods of inquiry, and potential for contributions to the community. It serves to enhance creative, professional, and cultural production within the University of North Carolina at Charlotte and to help lead the creative economy in the region and state. The College is responsive to both cross-cultural exchange and “crossover” research and programming and seeks to provide new connections to the public realm and new opportunities for community leadership.

Architecture

- Master of Architecture I
- Master of Architecture II
- Master of Urban Design

School of Architecture

Storrs Architecture Building
704-687-2336
www.soa.uncc.edu

Directors

Christopher Jarrett, Director
Kelly Carlson-Reddig, Associate Director

Master of Architecture Program Coordinator

Peter Wong

Master of Urban Design Program Coordinator

David Walters

Graduate Faculty

Jeff Balmer, Assistant Professor
Chris Beorkrem, Assistant Professor
Dale Brentrup, Professor
Kelly Carlson-Reddig, Associate Professor
Thomas Forget, Assistant Professor
José L.S. Gámez, Associate Professor
Thomas Gentry, Assistant Professor
Lee Gray, Associate Professor, Associate Dean
Ken Lambla, Professor, Dean

Zhong-jie Lin, Assistant Professor
 Emily Makas, Assistant Professor
 John Nelson, Associate Professor
 Deb Ryan, Associate Professor
 Erci Sauda, Professor
 Greg Snyder, Associate Professor
 Michael Swisher, Associate Professor
 David Thaddeus, Professor
 David Walters, Professor
 Betsy West, Associate Professor
 Peter Wong, Associate Professor

The School of Architecture at the University of North Carolina at Charlotte offers a fully accredited program recognized for the outstanding quality of its faculty and students, its commitment to outreach and community involvement, and the quality and extent of resources offered through its labs, classrooms, and studios. Students organize their study around concentrations in Urbanism, Technology, or Design, Theory & Practice. Each area of study is well supported not only by coursework but also by travel and research opportunities. The College participates in several international exchange programs and offers summer travel and study programs in Spain, Italy, Canada, Australia, and China to broaden students' global understanding and further inform their work. The specialized study of urban design is also focused under the auspices of a separate but interrelated graduate program in that discipline.

Each curricular program offers each student significant individual time and attention, an engaged and accessible faculty, and a wealth of diversity through both the interests of the faculty and the varied background of the graduate students themselves. Because the College stresses the importance of 'making' in addition to thinking, the wood, metal, computer, and laser workshops are all equipped with the latest high performance equipment to enable students to both explore and embody their design ideas. Contact with the profession is also emphasized and the School is frequently enriched by the expertise of local practitioners. An extensive lecture series involving nationally and internationally recognized designers and theorists further enhances the educational environment and exposure to contemporary schools of thought.

MASTER OF ARCHITECTURE

The Master of Architecture degree (MArch) serves two groups of students: 1) the three-year MArchI Program, which includes two summer sessions, accommodates students whose previous degree is outside the field of architecture; and 2) the two-year MArchII Program serves students who have already completed a four-year degree program in architecture at a National Architectural Accrediting Board (NAAB) accredited institution. The courses and options within each program are similar, but the advanced standing of MArchII students allows them to complete the degree requirements in two years. Students in both programs must complete a comprehensive design

studio and a thesis project under the advisement of a faculty committee. Full-time academic status is expected in both programs.

The MArchI Program involves four primary components: 1) the first year (including a summer session prior to the first fall of enrollment) focuses on establishing a strong foundation in fundamental design skills, architectural history and theory, building-to-site relationships, and introductory building technologies; 2) the second year focuses on comprehensive architectural design and its relationship to building systems as well as advanced studies in history, theory, and building technology; 3) the summer study program provides the opportunity to engage international education, research, or design experience; and 4) the third year is focused on the student's thesis research and project execution.

The MArchII Program is tailored through the advising process to the previous educational background of the students and to their individual professional and research goals. The program involves two primary components: 1) the first year focuses on comprehensive architectural building design and topical studios with advanced studies in the area of concentration; and 2) the second year is dedicated to continued study within the area of concentration as well as thesis research and project execution.

Admission Requirements

In addition to the admissions materials required by the Graduate School, the School of Architecture requires the submission of a portfolio of creative work. Applicants to the MArchI program should submit examples of work that offer evidence of creativity, self-motivation and critical appraisal. Such examples are not expected to be architectural in nature. Visual work such as painting, sculpture, furniture making, photography, etc. are acceptable, as are fiction writing, poetry, and any other reasonable evidence of sustained creative endeavor. Applicants to the MArchII program may offer similar evidence of any kind of creative endeavor but must also offer significant evidence of a mastery of architectural skill and knowledge.

The following requirements are expected of applicants to the MArchI and/or MArchII programs:

- 1) Students applying to the MArchII program who have completed the four-year professional track of the Bachelor of Arts in Architecture from UNC Charlotte must have an undergraduate degree grade point average of 3.25 or better to receive automatic admission.
- 2) Students applying to the MArchI program with a bachelors from a discipline other than architecture must complete their undergraduate degree with a minimum 2.75 grade point average overall, and a junior/senior grade point average of 3.0 overall.
- 3) Students must fulfill the university's Graduate School application requirements and submit a copy of their Letter of Intent, a current curriculum vitae, and a

portfolio of creative work at the time of their application.

Students who do not meet the grade point average requirements noted above may still submit an application for admission to both programs but admission will be weighed against those meeting these requirements.

Degree Requirements

Concentrations within the MArchI and MArchII Programs

At the end of the third semester of study, MArchI students are required to choose an area of concentration that will guide their advanced studies. MArchII students are required to choose an area of concentration during their first semester. Concentrations include: 1) Architectural Design, Theory, & Practice, 2) Urbanism, and 3) Architectural Technology. Concentration coursework is comprised of three elective courses (selected by the student from a larger set of eligible courses) and one elective studio with a focus similar to that of the concentration (offered as a topical studio). Concentration coursework is expected to support and culminate in thesis and/or capstone projects. The concentrations from which students can choose are described below:

1. Architectural Design, Theory, & Practice

This concentration focuses on a sophisticated and detailed study of building and site design arising from the representational methods intrinsic to architecture. The areas of focus include: graphic description, historical and/or theoretical inquiries, as well as digital design and fabrication. This concentration includes both investigation and criticism of contemporary practice and practitioners as it pertains to the understanding, design, and making of architecture.

2. Urbanism

This concentration focuses on the critical role of architecture in the city - the process and specific intent of physical intervention in urban landscapes and infrastructures. Through the design of groups of buildings as well as larger scale urban areas, issues of policy, politics, finance, planning, place, and culture are introduced as part of the essential conception and history of the city fabric.

3. Architectural Technology

This concentration focuses on study and experimentation addressing emerging issues of sustainable design and the creative development of building envelopes and systems that utilize both new and traditional materials, technology, and construction methods in innovative and beautiful ways. Seeking to explore the historical as well as contemporary realms of thermal, tactile and visual issues embedded in this field, students address appropriate material selection, methods of daylighting, passive and active systems for heating and cooling, etc. with consideration of both qualitative and quantitative outcomes.

Master of Architecture I Curriculum

The MArchI program requires a minimum of 89 hours to be completed during three academic years and two summer sessions.

GA Elective -- General Architectural elective

AH Elective -- Architectural History elective (minimum of one required during the second year of study)

C Elective -- Concentration elective (minimum of three required)

Year One

Summer (3 hours)

ARCH 5050 Introductory Design Experience (3)

Fall (13 hours)

ARCH 6111 Design Fundamentals Studio (7)

ARCH 5211 Architectural History Survey One (3)

ARCH 5601 Ideas in Architecture (3)

Spring (15 hours)

ARCH 6112 Design Fundamentals Studio (6)

ARCH 5212 Architectural History Survey Two (3)

ARCH 5312 Architectural Materials (3)

ARCH 5214/ARCH 6050 GA Elective or C Elective (3)

Year Two

Fall (14 hours)

ARCH 7101 Design Studio (5)

ARCH 5313 Structures One (3)

ARCH 5315 Environmental Control Systems (3)

ARCH 5213/6050 AH Elective or C Elective (3)

Spring (14 hours)

ARCH 7102 Topical Design Studio (5)

ARCH 5314 Structures Two (3)

ARCH 6151 Design Methodologies (3)

ARCH 5214/ARCH 6050 AH Elective or C Elective (3)

Summer (2 hours)

ARCH 7110 Summer Study Program (2)

Year Three

Fall (14 hours)

ARCH 7103 Topical Design Studio (5)

ARCH 5317 Building Systems Integration (3)

ARCH 7111 Project/Thesis Document Prep (3)

ARCH 5213/6050 C Elective, GA Elective, or Any Elective within the School of Architecture (3)

Spring (14 hours)

ARCH 7104 Project/Thesis Studio (8)

ARCH 5112 Professional Practice (3)

ARCH 5213/6050 C Elective, GA Elective, or Any Elective within the School of Architecture (3)

Master of Architecture II Program

The MArchII program requires a minimum of 56 credit hours to be completed during two academic years. If

applicants accepted to the MArchII Program are evaluated and found deficient in entry-level competencies, they will be required to enroll in additional course work beyond the 56 credits to complete their degree. Below is a list of expected entry-level competencies.

Expected Entry-Level Competencies for MArchII Candidates:

- 1) A minimum of six semesters of architectural design studios;
- 2) A minimum of four semesters of architectural history and/or theory courses;
- 3) A minimum of four semesters of building technology courses equivalent to the following UNC Charlotte's School of Architecture courses:

ARCH 5312 Architectural Materials
 ARCH 5313 Structures One
 ARCH 5314 Structures Two
 ARCH 5315 Environmental Control Systems

To ensure that incoming students are evaluated appropriately, the School of Architecture requires candidates for the MArchII program to furnish the Architecture Graduate Admissions Committee and Graduate Program Coordinator relevant course descriptions and syllabi of all architecture courses passed and completed which may satisfy entry-level competencies. The following curriculum is modeled for students accepted to the program who have satisfied all entry-level competencies.

Master of Architecture II Curriculum

GA Elective -- General Architectural elective
AH Elective -- Architectural History elective (minimum of one required during the second year of study)
C Elective -- Concentration elective (minimum of three required)

Year One

Fall (14 hours)

ARCH 7101 Design Studio (5)
 ARCH 5213 AH Elective (3)
 ARCH 5317 Building Systems Integration (3)
 ARCH 5213/ARCH 6050 C Elective or Any Elective within the School of Architecture (3)

Spring (14 hours)

ARCH 7102 Design Studio (5)
 ARCH 6151 Design Methodologies (3)
 ARCH 6050 C Elective (3)
 ARCH 5213/ARCH 6050 Any GA Elective (3)

Summer (3 hours - optional)

ARCH 7120 Graduate Summer International Study (Optional) (3)
 ARCH 7950 Graduate Summer Research Study (Optional) (3)

Year Two

Fall (14 hours)

ARCH 7103 Design Studio (5)
 ARCH 7111 Project/Thesis Document Prep (3)
 ARCH 5213/ARCH 6050 C Elective or Any Elective within the School of Architecture (3)
 ARCH 5213/ARCH 6050 C Elective, GA Elective, or Any Elective within the School of Architecture (3)

Spring (14 hours)

ARCH 7104 Project/Thesis Studio (8)
 ARCH 5112 Professional Practice (3)
 ARCH 5213/ARCH 6050 C Elective, GA Elective, or Any Elective within the School of Architecture (3)

Requisite & Capstone Experiences

Comprehensive Design Project

The Comprehensive Design Project serves as the requisite studio experience that bridges between foundational studios and advanced studios for MArchI students. The Comprehensive Design Project serves as the point of entry into the program for MArchII students. Taken in the third semester of enrollment for MArchI students and in the first semester of enrollment for MArchII students, the Comprehensive Design Project is defined as an architectural building design project that comprehensively demonstrates the student's ability to conceptualize, prepare, organize, and design a building having a specific programmatic type. All students must demonstrate comprehensive design competency before they enroll in Topical or Elective studios.

Thesis

The normative capstone project for both MArchI and MArchII students is the Thesis. For MArchI students, a thesis is defined as an architectural design project that demonstrates the student's ability to independently identify and engage a specific set of issues, a building type, and a site. For MArchII students, a thesis is defined as an architectural research project that engages and explicates primary source material leading to project work possessing an original argument. This type of project may include design-related materials as part of the final submission. Primary source material is data and information gathered from original texts and documents, interviews, raw data resulting from experiments, demographic data, etc. An original argument is a proposition that leads to original idea(s) in the discipline arising out of primary source material.

For the Thesis, the student identifies the issue(s) to be engaged and the research and/or design methods through which this engagement will take place. The student works independently with a committee during the final year of study to complete the Thesis. All students must demonstrate comprehensive design competency before they engage a Thesis.

Graduate Advising

A critical component of any successful graduate program is academic advising and guidance during the course of a student's program of study. The primary advisor for all graduate students in the College of Arts + Architecture will be the Associate Dean in consultation with the Graduate Coordinator. Students entering their final year will be asked to complete a Plan of Study and identify committee members from the faculty to serve as advisors for their thesis.

Transfer Credit

Transfer credit is normally limited to a maximum of six hours of graduate credit. Under special circumstances, a greater number of hours may be transferred if a student can demonstrate that the courses to be transferred meet or exceed the content and rigor of graduate curricula offered by the College.

Waiver Credit

Waiver credit may be allowed if a student can demonstrate that a course or courses taken in his or her undergraduate curriculum equals or exceeds in both content and rigor of a course or courses required in the graduate curriculum. If a required course in the curriculum is waived, the student will be allowed to fill those credit hours with another course as advised by the Associate Dean in consultation with the Graduate Coordinator.

Committees

For thesis, each student identifies three (3) School of Architecture faculty members who will contribute to his or her interests, research, and final project. In addition, one (1) committee member from outside the School of Architecture faculty is required. Additional individuals relevant to a student's final project may also participate as ex-officio members.

The members of the committee should offer specific areas of expertise and insight relative to the proposed project. Members of this committee should be involved with the project beginning with the preparation of the research document undertaken in ARCH 7111 (Research Document) in the Fall semester.

The responsibility of each committee member involves the following:

- 1) Review and provide feedback on three (3) successive versions of the student's written research document produced in ARCH 7111 (Research/Thesis Document).
- 2) Be present and provide feedback at all public presentations (4-5) conducted in ARCH 7104 (Comprehensive Design/Thesis Project Studio).
- 3) Provide feedback on other occasions as requested by the student.
- 4) Meet with instructors of ARCH 7111 and ARCH 7104 as required for coordination.

- 5) Deliberate with other committee members on the report concerning degree conferral.

Application for Degree

In order to meet UNC Charlotte's Graduate School requirements for degree candidacy, all graduate students must receive a written certification from their department confirming successful Thesis defense. This report requires approvals from members of each student's committee as well as an endorsement from the Chair of Instruction. The completion of this report results in the granting of the degree. In addition, each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

Research Opportunities

MARCH students must take ARCH 7110 in the summer prior to their final year. The premise of this course allows students to choose one of several course options, including opportunities for directed research, and to tailor a summer experience to support their growing knowledge of architecture and architectural discourse. This experience is intended to inform and motivate possible interests that the students might pursue in their final year of study. A similar opportunity exists for MARCHII students who take ARCH 7120 or ARCH 7950. There are three study options that students may engage:

1. Funded Research Option

Students may elect to receive course credit for work performed with faculty and/or other researchers who are conducting professional, scholarly, applied, and/or creative research within specialized fields of architecture theory, history, technology, etc. Current research initiatives include lighting and energy studies, building envelope studies, urban studies, design/fabrication, and design/theory studies. These activities are engaged through the Lighting & Energy Technology Lab, the Digital Design Center, the Charlotte Community Design Center, and through individual faculty research projects and ongoing architectural practice. Students may also complete the requirements by securing their own grants and funding to study a well-defined and focused architectural issue. Student initiated research of this type must be approved both by the student's Academic Advisor and by the Graduate Program Coordinator.

2. Independent Design Option

Students may elect to receive credit for this class by completing and entering a regional, national, or international architectural competition. This option is intended to further students' study of ideas and issues relevant to their thesis project and area of Concentration.

3. Off-Campus and/or International Study Option

Students may elect to enroll in School of Architecture off-campus or international study programs, and/or enroll in similar programs offered by other NAAB accredited institutions. The College has long-standing study/travel programs in both Italy and Spain. Students have also

pursued study opportunities in the Netherlands, Australia, Canada, etc. Glenn Murcutt's Master Class (Australia) and Brian MacKay Lyons' Ghost Project (Canada) are among the international study options that students may undertake.

Assistantships, Tuition Differentials, and Scholarships

A number of teaching assistantships, scholarships, non-resident tuition differentials (NRTD), graduate assistantship program support (GASP), and resident tuition waivers are available to both high performing MArchI and MArchII candidates. Awards are based on the applicant's academic merit or promise of academic merit, and/or on demonstration of need. Scholarships are awarded pending a review of student applications to various private endowments. All other awards allocated by the faculty.

Program Accreditation

National Architectural Accrediting Board

All graduate programs of the UNC Charlotte School of Architecture are fully accredited by NAAB as professional degree programs leading to licensure. The NAAB defines an accredited degree as described below:

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. A program may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.

Master's degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree, which when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.

Following the completion of a professional degree program accredited by the NAAB, most states require the future architect to complete an internship working for a registered architect before sitting for the licensing examination.

MASTER OF URBAN DESIGN

The Master of Urban Design degree (MUD) serves two groups of students: (1) BA or BS students holding a four-year architectural degree and/or those holding a professional architecture degree from a five-year or masters of architecture program; and (2) those holding a BA or BS undergraduate degree or a master's degree from disciplines other than architecture. The courses and options within the program can be completed in one and one half years of full time enrollment.

The MUD Program prepares students and professionals from design and planning disciplines to engage complex issues faced by towns and cities across America. The program uses the fast changing Charlotte metropolitan region as its laboratory to provide students with relevant design skills to influence urban life under the pressures of globalization, environmental change, and cultural diversification.

The first semester focuses on the fundamental skills and techniques of urban design; the second on issues of urban sustainability, and the third on advanced urban research through a complex urban design problem. Each semester also includes two seminar courses, several of which comprise individual elective choices from a menu of topics in urban design and urban history and theory.

Admission Requirements

In addition to the admissions materials required by the Graduate School, the School of Architecture requires the submission of a portfolio of creative work. Applicants to the MUD program should submit examples of work that offer evidence of creativity, self-motivation and critical appraisal. Such examples do not have to be solely urban design-related, but may also include visual work such as painting, sculpture, furniture making, photography, writing, and other reasonable evidence of their creative abilities and an interest in urban settings and conditions. Specific admission requirements by the School include:

- 1) Students must complete their undergraduate degree with a 2.75 grade point average overall, and a junior/senior grade point average of 3.0 overall.
- 2) Students must complete a Statement of Purpose describing their objectives relative to graduate study.
- 3) Students must fulfill the University's Graduate School application requirements in effect at the time of their application.

Master of Urban Design Curriculum

The MUD program requires a minimum of 36 hours to be completed. There are two study options: (1) a full-time program that can be completed in three semesters (Fall, Spring, Fall), or (2) a part-time option for working professionals that may be completed in three years.

Students also enrolled in the MArchII program may pursue a dual degree with a MUD if so noted at the beginning of their studies. Generally, this dual degree status will add approximately one year to the time required to complete the MArchII degree.

A: Full-Time Option

Year One

Summer (3 hours)

MUDD 5050 Preparatory Studio/Introductory Design Experience (3) *(For non-design based applicants only. May be waived if determined in the admissions process.)*

Fall (12 hours)

- MUDD 6111 Fundamentals of Urban Design Studio (6)
 MUDD 5601 Community Planning Workshop (3)
 MUDD 6213 Topics in Urban History and Theory History Elective (3)

Spring (12 hours)

- MUDD 6112 Sustainable Urbanism Studio (6)
 MUDD 5602 Planning Law and Urban Design (3)
 MUDD 6214 Topics in Urban History and Theory History Elective (3)
 --OR-- MUDD 6050 Topics in Urban Design Elective (3)

Year Two**Fall** (12 hours)

- MUDD 7101 Advanced Capstone Urban Design Studio (6)
 MUDD 6213 Topics in Urban History and Theory Elective (3)
 MUDD 6050 Topics in Urban Design Elective (3)

B: Part-Time Option**Year One****Summer** (3 hours)

- MUDD 5050 Preparatory Studio/Introductory Design Experience (3) *(For non-design based applicants only. May be waived if determined in the admissions process.)*

Fall (6 hours)

- MUDD 5601 Community Planning Workshop (3)
 MUDD 6213 Topics in Urban History and Theory History Elective (3)

Spring (6 hours)

- MUDD 5602 Planning Law and Urban Design (3)
 MUDD 6214 Topics in Urban History and Theory History Elective (3)
 --OR-- MUDD 6050 Topics in Urban Design Elective (3)

Year Two**Fall** (6 hours)

- MUDD 6111 Fundamentals of Urban Design Studio (6)

Spring (6 hours)

- MUDD 6112 Sustainable Urbanism Studio (6)

Year Three**Fall** (6 hours)

- MUDD 7101 Advanced Capstone Urban Design Studio (6)

Spring (6 hours)

- MUDD 6214 Topics in Urban History and Theory History Elective (3)
 MUDD 6050 Topics in Urban Design Elective (3)

Graduate Advising

A critical component of any successful graduate program is academic advising and guidance during the course of a student's program of study. The primary advisor for all graduate students in the School of Architecture will be the Associate Director in consultation with the Urban Design Program Coordinator.

Transfer Credit

Transfer credit may be granted under special circumstances and is limited to a maximum of six hours of graduate credit.

Waiver Credit

Waiver credit may be allowed if a student can demonstrate that a course or courses taken in his or her undergraduate curriculum equals or exceeds in both content and rigor of a course or courses required in the graduate curriculum. If a required course in the curriculum is waived, the student will be allowed to fill those credit hours with another course as advised by the Associate Director in consultation with the Urban Design Program Coordinator.

Application for Degree

In order to meet UNC Charlotte's Graduate School requirements for degree candidacy, all graduate students must receive a written certification from their department confirming a successful capstone project. This report requires approval from the program coordinator of the Urban Design program as well as an endorsement from the Director. The completion of this report results in the granting of the degree. In addition, each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

Research and Study Abroad Opportunities

MUD students may engage research activities via the College's Design + Society Research Center (DSRC). In addition students may elect to enroll in School of Architecture off-campus or international study programs for degree credit.

Assistantships, Tuition Differentials, and Scholarships

A number of teaching assistantships, scholarships, tuition differentials, and tuition waivers are available to MUD candidates. Awards are based on the applicant's academic merit or promise of academic merit, and/or on demonstration of need.

COURSES IN ARCHITECTURE

Studio Courses

ARCH 5050. Introductory Design Experience. (3) Cross-listed as MUDD 5050. Prerequisite: B.A., B.S. or equivalent college degree. This introductory graduate course in architecture is intended for students newly admitted to the School of Architecture's MArchI professional program. This three week, intensive studio-based course includes an introduction to freehand drawing, 2-D composition, 3-D modeling, and visual theory. In addition, the course offers an introduction to a variety of related topics (history, urbanism, structure, lighting, materials, etc.) that serve as critical departure points for understanding and making architectural and urban projects. *(Summer)*

ARCH 6111. Design Fundamentals/Skills. (7) Corequisite: ARCH 5601. This introductory architectural design studio focuses on fundamental concepts of architecture as well as the acquisition and practice of a wide range of technical and graphic skills and media. It is intended to complement the reading and writing engaged in ARCH 5601 (Ideas in Architecture) and to serve as an arena to explore and test the issues encountered in that course through the act of making. *(Fall)*

ARCH 6112. Design Fundamentals/Skills. (6) Prerequisite: ARCH 6111. This introductory architectural design studio focuses on the development of site, space, and design process issues as well as the continued acquisition and practice of a variety of technical and graphic skills. Exploration into the creative and appropriate use of a variety of media is addressed. *(Spring)*

ARCH 7101. Comprehensive Design Studio. (5) Prerequisite: ARCH 6112. This design studio focuses on a site-specific project emphasizing technological and systemic issues that lead toward a comprehensive building design. *(Fall)*

ARCH 7102. Topical Design Studio. (5) Prerequisite: ARCH 7101. This design studio focuses on issues relevant to current architectural practice and/or exploration of architectural theory. Students choose from among several sections of this studio, each of which addresses a different set of issues. The issues addressed as well as the pedagogical approach of these studios are defined by the faculty teaching them. All students must take a minimum of one Topical Design Studio within their area of Concentration. Course may be repeated with permission. *(Spring)*

ARCH 7103. Topical Design Studio. (5) Prerequisite: ARCH 7102. This design studio focuses on issues relevant to current architectural practice and/or exploration of architectural theory. Students choose from among several sections of this studio, each of which addresses a different set of issues. The issues addressed as well as the pedagogical approach of these studios are defined by the faculty teaching them. All students must take a minimum of one Topical

Design Studio within their area of Concentration. Course may be repeated with permission. *(Fall)*

ARCH 7104. Thesis Studio. (8) Prerequisite: ARCH 7103. This studio offers support and structure for students undertaking their individualized thesis project in either the MArchI or the MArchII program. For MArchI students, this studio will focus upon an individually defined architectural design project; for MArchII students, this studio will focus upon an individually defined research project (see Requisite & Capstone Experiences for more details). The faculty member teaching ARCH 7104 coordinates the activities of the students and their advisory committees. *(Spring)*

Core Courses

ARCH 5112. Professional Practice. (3) This course serves as an introduction to the objectives of the practice of architecture, its responsibilities and procedures, and emerging alternative forms of practice and as they pertain to the role of the architect. *(Spring)*

ARCH 5211. Architectural History I. (3) This course is a Western and non-Western survey of the theoretical, technical, and cultural background of architecture and urban design from prehistory to 1750. *(Fall)*

ARCH 5212. Architectural History II. (3) Prerequisite: ARCH 5211. This course is a Western and non-Western survey of the theoretical, technical, and cultural background of architecture and urban design from 1750 to present. *(Spring)*

ARCH 5312. Architectural Materials. (3) This course introduces the quantitative and qualitative characteristics of architectural materials, systems, and processes. Students will be introduced to the physical properties of materials relevant to their application in construction, assembly, and detail systems. Topics will include masonry, concrete, wood, steel, glass, cladding, and roofing and flooring materials and their assemblies. *(Spring)*

ARCH 5313. Structures One. (3) Prerequisite: ARCH 5312. This course introduces issues relevant to the fundamentals of structures including statics, strength, and stability of materials. Students will be introduced to structural concepts, systems, and the tracing of structural loads through basic principles, physical modeling, and theoretical and analytical methods. Topics will include interrelationship between strain, stress, and stability, as well as the implications of tension, compression, shear, torsion, and bending. *(Fall)*

ARCH 5314. Structures Two. (3) Prerequisite: ARCH 5313. This course introduces specific structural applications of wood, steel, concrete, and masonry systems commonly used in small-scale commercial/institutional buildings. Students will be introduced to the design of beams, columns, walls, joinery, and connections appropriate to each

material type through theoretical, analytical, and computer simulation methods. (*Spring*)

ARCH 5315. Environmental Control Systems. (3)
Prerequisite: ARCH 5312. Corequisite: ARCH 5313. This course introduces qualitative and quantitative analytical methods commonly used to assess the impact of environmental forces on occupant thermal and luminous comfort, energy performance, and regional sustainability. Students will be introduced to the interplay between climatic events, patterns of building use, and the architectural variables that inform the appropriate application of building systems technology. Topics will include building envelope performance, and the introduction of passive and mechanical systems for heating, cooling, illuminating, and ventilating buildings. (*Fall*)

ARCH 5317. Building Systems Integration. (3)
Prerequisites: ARCH 5314 and ARCH 5315. This course will introduce a set of advanced issues related to the comprehensive, systemic integration of building technology systems commonly used in large-scale buildings through case study, analytical, and simulation methods. Topics will address the resolution of building structure, materials, environmental systems, mechanical systems, electrical systems, life safety, building water supply and waste, and conveying systems in building design. (*Fall*)

ARCH 5601. Ideas in Architecture. (3) Prerequisite: ARCH 5050. Corequisite: ARCH 6111. This seminar class concentrates on fundamental concepts, issues, and working knowledge specific to design in architecture. It is intended to complement the design problems encountered in ARCH 6111 (studio) and to serve as a critical platform to raise issues that are not always evident in studio making alone. Primary topics addressed include order, form and space, site, type, and architectural meaning. (*Fall*)

ARCH 6151. Design Methodologies. (3) This course focuses on examination of analytic and synthetic models including information processing, programming, and implementation activities used to structure the architect's design process, conjectural models, and methods specific to the architect's creative skills. (*Spring*)

ARCH 7110. Summer Study Program. (2) Prerequisite: completion of the first two years of the COA MArchI Program (or equal). This course allows graduate students to support their growing knowledge of architecture and architectural discourse and is intended to inform and motivate interests to be pursued in a student's final year of study. There are three study options available for this course. The 7110 course requirement could be met through: 1) participation in an intensive summer "Mini-studio" that engages an architectural design competition; 2) through participation in an intensive summer design experience such as Master Class program (Australia), Ghost Lab (Nova Scotia), Design Corps (North Carolina) or through a foreign study program offered through the School of Architecture; 3) or through participation in a summer

field study program that engages appropriate research or design activities that further a student's understanding of her/his thesis or capstone project with the approval of the Graduate Program Coordinator and the Chair of Instruction. (*Summer*)

ARCH 7111. Research Document. (3) This course provides structure for the formation and exploration of the ideas and issues relevant to the thesis project in either the MArchI or MArchII programs. This project is to be undertaken individually by students in their final year of study. This course results in the documentation of relevant research in preparation for the execution of the project, which is carried out in ARCH 7104. (*Fall*)

ARCH 7120. Graduate Summer International Study. (5)
Cross-listed as MUDD 7120. Prerequisite: completion of first year of the MArchII Program (or equal). ARCH 7120 is an optional International Study course that MArchII students may engage in the summer prior to their final year. The premise of this course is to allow graduate students to engage a summer experience abroad to support their growing knowledge of architecture and architectural discourse. This experience is intended to inform and motivate possible interests that the students might pursue in their final year of study. (*Summer*)

ARCH 7950. Graduate Summer Research Study. (3)
Prerequisite: completion of first year of the MArchII Program (or equal). ARCH 7950 is an optional opportunity for research that MArchII students may engage in the summer prior to their final year. The premise of this course is to allow graduate students to engage research activities to support their growing knowledge of architecture and architectural discourse. This experience is intended to inform and motivate possible interests that the students might pursue in their final year of study. (*Summer*)

ARCH 7999. Master's Degree Graduate Residency Credit. (1) Prerequisite: Consent of the instructor(s) overseeing thesis research and of the Graduate Coordinator. Required of all Master's degree students who are working on a thesis but are not enrolled in other graduate courses. (*Fall, Spring, Summer*)

Concentration Electives

Concentration Electives are those non-studio courses that fulfill the requirement for coursework within a student's chosen area of Concentration. Possible areas of Concentration are (1) Architectural Design, Theory, & Practice, (2) Urbanism, and (3) Architectural Technology. Three non-studio courses in the student's chosen area of Concentration are required to complete the curriculum. (See current School of Architecture Prospectus for a complete listing of courses.) Additional urbanism concentration course are listed under the Master of Urban Design course descriptions under MUDD 6213/6214 and MUDD 6050. ARCH 6050 is a repeatable course that may be taken by graduate students in the School of Architecture and may be repeated for credit as topics change.

Architectural Design, Theory, & Practice

ARCH 6050. Digital Theory. (3) An introduction in the fundamentals of digital design & representation techniques, within the context of theoretical works since the industrial revolution. The course will develop a set of aesthetic, performative, and method based criteria for understanding digital work. This framework will serve as a starting point for students to assess a developing set of digital design values.

ARCH 6050. Digital Methods 1. (3) Course focusing on modeling, shading and rendering using Maya 3D software. The class will explore other relevant representation tools, and the proper methods for achieving seamless integration between such tools.

ARCH 6050. Digital Methods 2. (3) This course explores the generative and parametric methods as they impact the practice of architecture. A comprehensive use of various software packages will exploit the computer's ability to cross-reference geometric relationships, data sets, and parametric variables.

ARCH 6050. Digital Fabrication 1. (3) This course employs ideas from industrial, mechanical, and technical construction as precedent for digital spaces and programs. The course will analyze contemporary projects to understand related programs, constructed spaces, and conceptual ideas. Using parametric design techniques, spaces and designs will be computer-generated using dynamic systems and modifiers.

ARCH 6050. Digital Fabrication 2. (3) A continuation of "Digital Fabrication 1," utilizing more advanced hardware and software fabrication techniques.

ARCH 6050. Modern Perception: Linear Perspective and Motion Pictures. (3) This seminar examines how techniques of spatial representation interact with architectural and urban ideas. The extent to which ideas of perception create, as opposed to reflect, cultural change is debatable. Both linear perspective and cinema are paradigms of spatial perception that coincide with broader revolutions in art and culture. These two practices will serve as case studies through which to explore the complex relationship between art, architecture, and vision.

ARCH 6050. ArtXArch: Art, Architecture and the Built Environment. (3) This course will visit and animate familiar and uncanny examples of the built environment, using as its reference the relationship between architecture's tenets and contemporary visual artists' motives across the fields of architecture, art, media, and politics. It examines how artists both borrow from and move beyond architecture by building an aesthetic and critical case for the necessary and culturally redemptive practice of art within architectural contexts.

ARCH 6050. An Architecture of Questionable Effects. (3)

This course will discuss the promise and problems of architecture understood as a set of perceptual effects. This position of interpreting buildings is rooted in the discipline's connection to the visual arts – for example: the discovery of perspective and its influence on painting, the invention of photography and the moving image, or the use of electronic media for creating aesthetic complexity in the building arts.

ARCH 6050. Representation: Exploits of the Architectural Image. (3) This course offers an exploration of design themes in the two-dimensional, image-based world of the architect. It defines contemporary architectural representations and surveys ideas that center on drawing in architectural practice.

Urbanism

ARCH 6050. Introduction to Urban Design. (3) Cross-listed within MUDD 6050 Topics in Urban Design. Course covering how cities, suburbs, and metropolitan areas develop and change. Topics range from grand ideas proposed by individuals to smaller more incremental processes carried out through collaborating parties.

ARCH 6050. Community Planning Workshop. (3) Cross-listed as MUDD 5601. This course serves to acquaint students with contemporary theory and practice in planning and urban design; to give students experience in applying planning and urban design theory and methods to actual problems; to provide students with experience in compiling and analyzing community scale data, working with citizens, professional planners and designers, and elected officials, to provide students with experience in the preparation of oral reports and technical documents; and to examine what it means for the planner and urban designer to demonstrate ethical responsibility to the public interest, to clients and employers, and to colleagues and oneself.

ARCH 6050. Shaping The American City. (3) Cross-listed as MUDD 6050. Throughout the Twentieth Century urban politics, policies, and programs have shaped the space of the American City, including the architecture of urban settlement patterns, public space, transportation, and housing. An understanding of the political/social/historical/spatial foundations of urban policies in relation to the American City is critical in understanding the development of our current urban patterns, the spatial distribution of people and resources, and the future production of architecture and design in urban settings. Issues will be framed in the interstices of the space/knowledge/power triad. *(On demand)*

ARCH 6050. Strategies for the Public Realm. (3) Cross-listed as MUDD 6050. Contemporary theories and practices in urban design underscore the connection between the citizen and the public realm and between the physical and social attributes of the city. Urban design is not so much an aesthetic as it is a strategy for change, transformation, dialogue, and interaction. Urban design is the link between architecture and urbanism, tying together

the city's disparate parts and celebrating the complexity and connectedness of space. *(On demand)*

ARCH 6050. Dilemmas of Modern City Planning. (3) Cross-listed as MUDD 6050. The patterns of man's settlement are predicated upon particular paradigms of urbanism, as well as more pragmatic concerns of politics, economics and geography. An examination of these influences and their interconnections provides the necessary theoretical and historical background from which to propose improvements to the contemporary landscapes of our cities. *(Spring)*

ARCH 6050. Mayors' Institute on City Design / South (3) Cross-listed as MUDD 6050. The Mayors' Institute on City Design is comprised of a series of symposia on city design. At each meeting of the Institute, mayors and designers discuss specific problems facing cities and examine a broad range of design ideas, examples from other cities, and strategies to make improvements. Each student will be assigned a mayor and a city with which to work and will develop a case study for that city. Whenever possible, students will make site visits and help determine how the design arts can benefit the development of their particular city. The goals of the course are to familiarize students with the basic techniques of urban analysis and principles of urban design; introduce students to the interrelationships between urban form, building use and transportation, economics, and politics; consider the role of the public in civic design; and consider strategies for a more sustainable and ecologically appropriate urban architecture. *(On demand)*

ARCH 6050. Post-CIAM Discourse on Urbanism. (3) Cross-listed within MUDD 6213/6214 Topics in Urban History and Theory. This seminar will examine the evolution of postwar urbanism as a particular synthesis of cultural criticism, shift of direction in practice, and various architectural experimentations. They represented innovative responses to the changed sociopolitical and cultural conditions from different perspectives. The central focus of investigation will be the essential theories of urbanism and experimental design practice from the mid 1950s to the early 1970s.

ARCH 6050. Real Estate Development Studies: Introduction to Real Estate Development. (3) Cross-listed as MUDD 6050. The production of buildings requires both architectural and economic skill. Likewise, the production of our landscape is both a private and public endeavor. To balance these skills and endeavors requires an understanding of basic facts. This course focuses on an introduction to the real estate development process. Course material, lectures and case studies focus on the identification and evaluation of critical assumptions and issues related to market and site feasibility, financial feasibility, planning, acquisition, construction, and operation of economically viable commercial real estate projects. *(Fall)*

ARCH 6050/4213-U01/6133. Public Space in Cities. (3) Cross-listed as MUDD 6050. The public realm has historically constituted a set of real places possessing physical form and has been the setting for civic and communal life. This traditional role of public space is brought into question by the advent of cyberspace, with unknown consequences for city form. This course focuses on the origins and transformations of public space within American culture, and to understand principles of urban design as they have related to the creation of public space during different historical periods. Course material will also focus on the historical connection between the public realm and democratic principles, and the threats to the continued existence of truly public space in American cities. *(On demand)*

ARCH 6050. Urban Form, Context and Economics. (3) Cross-listed as MUDD 6050. Urban development and redevelopment can be considered typologically in two main categories: large "catalyst" projects (performing arts centers, entertainment complexes, and other large, mixed-use projects); and smaller, incremental interventions in the urban setting that lack glamour but contribute much needed depth and complexity to the urban environment. This course focuses on how and why urban projects are formulated by public and private interests. It engages the conceptual origins, design development and production of urban projects large and small, in an effort to understand the relationship between development economics, social factors, program development, design concepts and urban contexts.

ARCH 6050. The Changing Urban Landscape: The Development of Uptown Charlotte, 1875-2000. (3) Cross-listed as MUDD 6050. The design and evolution of cities is a reflection of evolving attitudes about gender, race, crime and socioeconomic conditions as well as governmental interventions and the efforts of private enterprise. Charlotte's center city is a unique result of those many influences and serves as an excellent laboratory for gaining an understanding of the forces that shape the making of the places we live. This class will explore the historical growth of Charlotte through the eyes of city leaders who have lived through it. Specific topics will include the development of First Ward from a public housing ghetto to a mixed income neighborhood, the demise of the Brooklyn neighborhood in Second Ward, professional sports in uptown Charlotte, the development of Fourth Ward, the civic patron/ corporate factor, transportation in Uptown Charlotte and finally, the 2010 Plan for Uptown. *(On demand)*

Architectural Technology

ARCH 6050. Site Sustainability and Planning. (3) A project-based seminar that introduces concepts and methods for developing ecologically based site plans within the context of economic and social issues. Students work in teams to generate redevelopment plans for local sites in Charlotte, North Carolina.

ARCH 6050. Sustainability and Climate Responsive

Architecture. (3) This course introduces the technical and practical issues of climate responsive architecture by providing an overview of passive control systems. The class provides a survey of solar, wind and other environmental opportunities as means for understanding passive techniques for building.

ARCH 6050. Building Shapes and Skins for Daylighting.

(3) A case study course that evaluates building form and enclosure lighting data from an existing building. Computer simulated parametric analysis are then generated to study alternative design scenarios. The course utilizes Spot and UNC Charlotte-Light simulation tools, including Eco-tech, DaySim and Radiance.

ARCH 6050. Parametric Methods: Notes on Sustainable Design Decision Making.

(3) A formal design decision-making process is developed in this course through the elaboration of the systemic principles that describe the role of architecture to reconcile the pertinent utilization of mechanical, electrical and material system choices. Issues of the implicit role of the architect to understand the application of appropriate building systems technology, public policy decisions and economic solutions that provide for the sustained delivery of human, environmental and physical performance are brought to bear through a variety of methods.

ARCH 6050. Bio-climatology & Cross Cultural Assessments of Traditional Built Form. (3) Through this course a conceptual framework of social and technical determinism is developed from a single disciplinary point of view based on the traditions of building design science and environmental technology informed through social science theory. Topical field assessments will be developed through a research-based introduction of the Human Relations Area Files to address the cultural/societal and technical realms that describe traditional built form. The issues that have influenced and are currently impacting human settlement, building, and tectonic design are explored through the use of the Mahoney Tables to weave the relevant connections to built formal response and the interpretation of climatically responsive architectural principles of design sustainability.

ARCH 6050. Architectural Luminous Environment. (3) The architectural luminous environment is introduced in this course as a continuum of technical/material innovation from 1850 to the present. Issues of daylighting and electric lighting are explored as an integrated systems approach to evaluate current sustainable design practices that relate to energy utilization and appropriate resource allocation. Case study research methods of assessment, computational analysis, physical modeling and economic evaluation will be introduced.

ARCH 6050. Sustainable Design: Ecology, Technology and Building. (3) Sustainable design is the term most commonly used when describing building carried out according to sound ecological and environmental perspectives. Utilizing a lecture/seminar/case study format

the course content will survey the principles of environmentally sensitive design, review case studies of "green building" applications, and explore various concepts for integrating sustainable planning and building principles into the form making process of architectural design. The process includes an analysis of bioclimatic comfort, climate responsive design, integration of passive heating and cooling systems, and the basis for specifying sustainable building materials. The intention of the course is to develop a general understanding of the fundamental principles underlying sustainable design and the impact on the building design process and built form.

ARCH 6050. Building Information Modeling (BIM). (3)

Course addressing issues and opportunities afforded by Building Information Modeling (BIM) programs. It includes: (1) an introduction to definitions, principles and strategies, (2) an understanding of how BIM allows an integrated design process that encourages creative and appropriate solutions, and (3) to engage BIM software use via the modeling of a building example.

Architectural History Electives

Architectural History electives offer a topical study of issues or areas of history. These courses complement the architectural history survey courses (ARCH 5211/5212), and serve to inform and develop in-depth research, writing, and presentation skills. One Architectural History Elective course must be taken during the first year of study for MArchII student and during the second year of study for MArchI students. Additional Architectural History Elective courses may be taken as desired. These courses do not count towards completion of Concentration requirements unless cross-listed. Cross-listed courses are marked with an asterisk (See current School of Architecture Prospectus for a complete listing of courses.)

ARCH 5213/5214. The Architecture of the Italian Renaissance.

(3) This course will examine the history of architecture in Italy during the Renaissance. This study will include issues such as the aesthetic program of Renaissance architecture and attitudes toward the Roman classical past, new architectural theories, and architectural space, technology, and urban planning.

ARCH 5213/5214. Renewing the Modernist Debate: The Theory and Works of Adolf Loos.

(3) At the beginning of the 21st century, architecture finds itself in a state of uncertainty and change. Like 100 years before, architects are pursuing ways of reconfiguring the aesthetic, technical, and social demands of their profession in hopes of establishing legitimacy in their work. This class will investigate the buildings and ideas of the early 20th century architect, Adolf Loos (1870-1933), as a vehicle to come to grips with our own precepts about modern architectural theory and practice.

ARCH 5213/5214. Histories of Latin American Architecture.

(3) Cross-listed as LTAM 6350. This course will survey the ways by which Latin American architectures (both north and south of the US/Mexico border) have come

to be seen within the western canon. In this sense, this course is not purely historical; rather, the class will explore Latin American architectures chronologically but from a post-colonial perspective rooted in the present.

ARCH 5213/5214. Popular Modernism: Charlotte Architecture in the '50's and '60's. (3) This course will investigate the influence of 1950s and 60s modern international architecture on Charlotte and the Piedmont region. The goals of the course are: (1) to probe deeper into why this type of architecture became popular in the region, in both its private and public iterations, and (2) to link this interest with similar developments in other American cities, and to discuss such developments within the context of international architecture of the same period.

General Architectural Electives

General Architectural Elective courses offer study of a wide range of topical areas in architecture. Students can choose from among many courses, each of which addresses a different topic. These courses complement the core courses and studios and allow students to pursue their specific interests. These courses do not count towards completion of Concentration requirements unless cross-listed. Cross-listed courses are marked with an asterisk. (See current School of Architecture Prospectus for a complete listing of courses.)

ARCH 6050. Trend or Truth: Sustainability in Architecture. (3) This course is structured as an overview of sustainable design and how this subject is defined within the parameters of the built environment. It is designed to introduce students to a broad base of concepts, philosophies, and practices of sustainable design.

ARCH 6050. Objects and Analysis. (3) Prerequisite: ARCH 4050 (Furniture Making) or ARCH 4050 (Making Simple Tools). This course is an examination of the identity of objects and furniture in relation to ritual and space. Through coursework students will develop a historical ground and analytical methods that will extend into the making of an object. This making will involve the exercise of fine craftsmanship in a combination of media.

ARCH 6050. Architecture/Culture/Discourse. (3) This course traces ideological movements that have informed the discipline of architecture both past and present. In this sense, this course provides a historical vantage point from which to view how theories of architecture and the city develop as inter-related ideas, practices, and traditions through the persistence of specific themes over time and space.

ARCH 6050. Methods and Meaning. (3) This course examines a range of architectural ideas with an emphasis on developments from the late 1960s to the present. Attention will be paid to the interrelation between theory and practice and how clusters of ideas formulate the discourse as trends both mainstream and marginal. Emphasis will be placed on texts and their interpretation alongside examples of work

inspired by the same. This survey means to formulate a broad understanding of contemporary architectural culture.

ARCH 6050. Watercolor & Representation I. (3) The practice of watercolor can make many design notions clear for the maker as well as the observer. This course introduces basic visual strategies utilizing tactics and techniques of watercolor. The class focus is on developing a practical vocabulary for skillful representation and emphasizes a working knowledge of watercolor painting and its application at all phases of design work. Students will develop skills presenting objects in space using watercolor and pencil.

ARCH 6050. Advanced Watercolor Representation. (3) This class emphasizes the development of working methods for thoughtful representation using watercolor for all phases of design work. Issues and skills addressed include analysis; representation of interior and exterior spaces and events; representation of urban context and site; and presentation of organizational strategies.

ARCH 6050. Furniture Making. (3) This is a laboratory course in the fundamentals of designing and building of furniture, primarily in wood. Included are the basics of materials selection, machine and hand tool use, joinery, and finishing. The crafting of furniture of student's design is an integral part of the course.

ARCH 6890. Directed Independent Study. (1-3) Prerequisite: permission of the Graduate Coordinator and the graduate faculty member advising the study. This course enables directed individual study and in-depth analysis of a special area related to the interests of the student and the expertise of the advising faculty member. May count towards completion of Concentration requirements if appropriate. May be repeated for credit as topics change. *(Fall, Spring, Summer)*

COURSES IN URBAN DESIGN

Studio Courses

MUDD 5050. Introductory Design Experience. (3) Cross-listed as ARCH 5050. Prerequisite: B.A., B.S. or equivalent college degree. This introductory graduate course in architecture and urbanism is intended for students newly admitted to the School of Architecture's Master of Urban Design program but without a design background. This three week, intensive studio-based course includes an introduction to freehand drawing, 2-D composition, 3-D modeling, and visual theory. In addition, the course offers an introduction to a variety of related topics (history, urbanism, structure, lighting, materials, etc.) that serve as critical departure points for understanding and making architectural and urban projects. *(Summer)*

MUDD 5601. Community Planning Workshop. (3) Cross-listed as ARCH 6050. This course serves to acquaint students with contemporary theory and practice in planning

and urban design; to give students experience in applying planning and urban design theory and methods to actual problems; to provide students with experience in compiling and analyzing community scale data, working with citizens, professional planners and designers, and elected officials, to provide students with experience in the preparation of oral reports and technical documents; and to examine what it means for the planner and urban designer to demonstrate ethical responsibility to the public interest, to clients and employers, and to colleagues and oneself.

MUDD 6111. Fundamentals of Urban Design Studio. (6) This introductory urban design studio focuses on fundamental concepts as well as the acquisition and practice of a wide range of technical and graphic skills and media. It is intended to serve as an arena to explore and test issues focused around the making of public infrastructure, spatial definition by buildings, and the particular dynamics of civic and social spaces. *(Fall)*

MUDD 6112. Sustainable Urbanism Design Studio. (6) Prerequisite: MUDD 6111. This intermediate design studio focuses on the sustainable development of neighborhoods, districts, sites and spaces, exploring design process issues as well as the continued acquisition and practice of a variety of technical and graphic skills. *(Spring)*

MUDD 7101. Advanced Capstone Urban Research & Design Studio. (6) Prerequisite MUDD 6112. This advanced design studio focuses on site-specific projects and emphasizes methods of research and design as well as technological and systemic issues of sustainability in urban environments. This course will pursue a directed research and design agenda that will vary according to faculty interest, expertise and/or project requirements. In addition, this course may build upon the resources of the Design + Society Research Center (DSRC) at the School of Architecture. *(Fall)*

MUDD 7120. Graduate Summer International Study. (3-6) Cross-listed as ARCH 7120. Prerequisite: completion of first year of the M.U.D. Program and approval of Program coordinator. This is an optional International Study course that M.U.D. students may engage in the summer prior to their final year. The premise of this course is to allow graduate students to engage a summer experience abroad to support their growing knowledge of architecture and architectural discourse. This experience is intended to inform and motivate possible interests that the students might pursue in their final year of study. *(Summer)*

MUDD 7134. Independent Capstone Research Project (6) Prerequisite: MUDD 6112. This is an alternative capstone course to MUDD 7101. This advanced project offers support and structure for students undertaking their capstone experience as individualized research and/or design work within the parameters of the M.U.D program but outside the 2 normative full-time sequence of studios or as part of a dual degree option with an individually tailored course plan. An individually defined urban research and/or

design project will be taken under the direction of a M.U.D faculty member and other advisors as appropriate. *(Fall, Spring)*

Required Seminar Courses

MUDD 5602. Planning Law and Urban Design. (3) This course examines the impact of planning law on the urban form of cities, both historically and in terms of contemporary professional practice. It surveys the impacts of planning regulations from Philip of Spain's "Laws of the Indies" at the beginning of American colonization through the development of English common law property rights, their extension to America and the development of zoning and planning legislation during the 20th century. Special attention is paid to current applications of form-based zoning codes in Britain and America and their implications for urban design and the patterns of settlement. *(Spring)*

Elective Seminar Courses

MUDD 6050. Topics in Urban Design Elective. (3) Study of topical areas of urbanism and urban design. May be repeated for credit as topics of course change. *(Fall, Spring)*

MUDD 6050. Urban Form, Context and Economics. (3) Cross-listed as ARCH 6050. Urban development and redevelopment can be considered typologically in two main categories: large "catalyst" projects (performing arts centers, entertainment complexes, and other large, mixed-use projects); and smaller, incremental interventions in the urban setting that lack glamour but contribute much needed depth and complexity to the urban environment. This course focuses on how and why urban projects are formulated by public and private interests. It engages the conceptual origins, design development and production of urban projects large and small, in an effort to understand the relationship between development economics, social factors, program development, design concepts and urban contexts. *(Spring)*

MUDD 6050. Shaping The American City. (3) Cross-listed as ARCH 6050. Throughout the Twentieth Century urban politics, policies, and programs have shaped the space of the American City, including the architecture of urban settlement patterns, public space, transportation, and housing. An understanding of the political/social/historical/spatial foundations of urban policies in relation to the American City is critical in understanding the development of our current urban patterns, the spatial distribution of people and resources, and the future production of architecture and design in urban settings. Issues will be framed in the interstices of the space/knowledge/power triad. *(On demand)*

MUDD 6050. Dilemmas of Modern City Planning. (3) Cross-listed as ARCH 6050. The patterns of man's settlement are predicated upon particular paradigms of urbanism, as well as more pragmatic concerns of politics, economics and geography. An examination of these influences and their interconnections provides the necessary

theoretical and historical background from which to propose improvements to the contemporary landscapes of our cities. (*Spring*)

MUDD 6050. Strategies for the Public Realm. (3) Cross-listed as ARCH 6050. Contemporary theories and practices in urban design underscore the connection between the citizen and the public realm and between the physical and social attributes of the city. Urban design is not so much an aesthetic as it is a strategy for change, transformation, dialogue, and interaction. Urban design is the link between architecture and urbanism, tying together the city's disparate parts and celebrating the complexity and connectedness of space. (*On demand*)

MUDD 6050. Public Space in Cities. (3) Cross-listed as ARCH 6050. The public realm has historically constituted a set of real places possessing physical form and has been the setting for civic and communal life. This traditional role of public space is brought into question by the advent of cyberspace, with unknown consequences for city form. This course focuses on the origins and transformations of public space within American culture, and to understand principles of urban design as they have related to the creation of public space during different historical periods. Course material will also focus on the historical connection between the public realm and democratic principles, and the threats to the continued existence of truly public space in American cities. (*On demand*)

MUDD 6050. The Changing Urban Landscape: The Development of Uptown Charlotte, 1975-2000. (3) Cross-listed as ARCH 6050. The design and evolution of cities is a reflection of evolving attitudes about gender, race, crime and socioeconomic conditions as well as governmental interventions and the efforts of private enterprise. Charlotte's center city is a unique result of those many influences and serves as an excellent laboratory for gaining an understanding of the forces that shape the making of the places we live. This class will explore the historical growth of Charlotte through the eyes of city leaders who have lived through it. Specific topics will include the development of First Ward from a public housing ghetto to a mixed income neighborhood, the demise of the Brooklyn neighborhood in Second Ward, professional sports in uptown Charlotte, the development of Fourth Ward, the civic patron/ corporate factor, transportation in Uptown Charlotte and finally, the 2010 Plan for Uptown. (*On demand*)

MUDD 6050. Real Estate Development Studies: Introduction to Real Estate Development. (3) Cross-listed as ARCH 6050. The production of buildings requires both architectural and economic skill. Likewise, the production of our landscape is both a private and public endeavor. To balance these skills and endeavors requires an understanding of basic facts. This course focuses on an introduction to the

real estate development process. Course material, lectures and case studies focus on the identification and evaluation of critical assumptions and issues related to market and site feasibility, financial feasibility, planning, acquisition, construction, and operation of economically viable commercial real estate projects. (*Fall*)

MUDD 6050. Mayors' Institute on City Design/South. (3) Cross-listed as ARCH 6050. The Mayors' Institute on City Design is comprised of a series of symposia on city design. At each meeting of the Institute, mayors and designers discuss specific problems facing cities and examine a broad range of design ideas, examples from other cities, and strategies to make improvements. Each student will be assigned a mayor and a city with which to work and will develop a case study for that city. Whenever possible, students will make site visits and help determine how the design arts can benefit the development of their particular city. The goals of the course are to familiarize students with the basic techniques of urban analysis and principles of urban design; introduce students to the interrelationships between urban form, building use and transportation, economics, and politics; consider the role of the public in civic design; and consider strategies for a more sustainable and ecologically appropriate urban architecture. (*On demand*)

MUDD 6100. Directed Independent Study. (1-3) Prerequisite: permission of the Program Coordinator and the graduate faculty member advising the study. This course enables directed individual study and in-depth analysis of a special area related to the interests of the student and the expertise of the advising faculty member. May be taken once for credit towards degree. (*Fall, Spring, Summer*)

MUDD 6213. Topics in Urban History and Theory Elective. (3) Study of topical areas of urban history and theory. May be repeated for credit as topics change. (*Fall, Spring*)

MUDD 6214. Topics in Urban History and Theory Elective. (3) Study of topical areas of urban history and theory. May be repeated for credit as topics change. (*Fall, Spring*)

Other Courses

MUDD 7999. Master's Degree Graduate Residency Credit. (0) Prerequisite: permission of the instructor(s) overseeing research and of the M.U.D Program Coordinator. Non-graded course to provide continuity of enrollment. Required of all Master's degree students in the Urban Design program who are working on a research project but are not enrolled in other graduate courses. (*Fall, Spring, Summer*)



Belk College of Business

www.belkcollege.uncc.edu

Dean: Joseph B. Mazzola

Associate Dean for Faculty and Research: John M. Gandar

Interim Associate Dean for Graduate Programs: Christie H. Amato

Interim Assistant Dean for Global Programs: Richard M. Conboy

Assistant Dean for Undergraduate Programs: Daryl L. Kerr

The Belk College of Business is accredited by AACSB International, the premier accrediting agency for academic programs in business administration and accounting. Our challenging master's programs in Accountancy, Business Administration, Economics and Mathematical Finance provide graduates with the tools they need to succeed in business. Courses are taught by full-time faculty with Ph.D.'s from top schools whose research is published in top-level journals and whose expertise is highly sought after by industry executives. Students have the opportunity to network with professionals from a variety of fields, and interact with alumni and leaders from Charlotte's dynamic business community. These programs provide flexible schedules with courses offered both at UNC Charlotte's main campus and at our Uptown campus in the heart of Charlotte's Center City, so that working professionals may earn their graduate degree without interrupting their careers.

College of Business Graduate Degree Programs

- Ph.D. in Business Administration
- Master of Accountancy
- Master of Business Administration
- Master of Business Administration in Sports Marketing and Management
- Master of Science in Economics

Interdisciplinary Degree Programs

- Master of Science in Mathematical Finance
(the Departments of Finance and Economics in the Belk College of Business are participating departments in the Inter-College Master of Science in Mathematical Finance program. See the Inter-College Graduate Programs

section of this Catalog for complete information and program requirements)

- Ph.D. in Information Technology - Business Track
(The Belk College collaborates with the College of Computing & Informatics on the Ph.D. in Information Technology – Business Track)
- Ph.D. in Organizational Science
(Faculty from the Belk College's Department of Management teach in the multidisciplinary Ph.D. in Organizational Science program, located in the College of Liberal Arts & Sciences section of this Catalog)
- Ph.D. in Public Policy
(Faculty from the Belk College's Department of Economics teach in the multidisciplinary Ph.D. in Public Policy program, located in the College of Liberal Arts & Sciences Section of this Catalog)

Graduate Non-Degree Programs

- MBA PLUS Post-Master's Certificate
- Graduate Certificate in Real Estate and Development

Graduate Faculty

Accounting

Sak Bhamornsiri, Associate Professor
 Alan Blankley, Associate Professor
 Hughlene Burton, Associate Professor
 Jack Cathey, Interim Chair and Associate Professor
 Nabil Elias, Associate Professor
 Howard Godfrey, Professor
 Bob Guinn, Associate Professor
 David Kerr, Associate Professor
 Richard Schroeder, Professor

Suzanne Sevin, Clinical Professor
Casper Wiggins, Big Five Distinguished Professor

Business Information Systems and Operations Management

W. Douglas Cooper, Professor
Xiuli He, Assistant Professor
Monica S. Johar, Assistant Professor
Moutaz J. Khouja, Chair and Professor
Ram L. Kumar, Professor
Ying Lu, Assistant Professor
Joseph B. Mazzola, Dean and Belk Distinguished Professor of Business
Sungjune Park, Associate Professor
Stephanie S. Robbins, Professor
Cem Saydam, Professor
Anthony C. Stylianou, Professor
Chandrasekar Subramaniam, Assistant Professor
Kexin Zhao, Assistant Professor
Jing Zhou, Assistant Professor

Economics

Louis "Ted" Amato, Professor
John E. Connaughton, Professor
William Y. Davis, Jr., Professor
Craig A. Depken, II, Associate Professor
John M. Gandar, Associate Dean for Faculty and Research and Professor
Steve Guo, Part-time Lecturer
Hwan C. Lin, Associate Professor
Gaines H. Liner, Professor
Ronald A. Madsen, Professor
Rob Roy McGregor, Professor
Stanislav I. Radchenko, Associate Professor
Benjamin Russo, Associate Professor
Peter M. Schwarz, Professor
Dmitry Shapiro, Assistant Professor
Ellen M. Sewell, Assistant Professor
Caroline Swartz, Clinical Professor
Jennifer Troyer, Associate Professor
Hui-Kuan Tseng, Associate Professor
Arthur Zillante, Assistant Professor
Richard A. Zuber, Chair and Professor

Finance

Lloyd P. Blenman, Professor
Richard J. Buttimer Jr., Associate Professor
Steven P. Clark, Associate Professor
W. Keener Hughen, Assistant Professor
Tao-Hsien "Dolly" King, Associate Professor of Finance and Rush S. Dickson Professor of Finance
Samuel M. Kirkland, III, Adjunct Professor
Steven Ott, John Crosland Sr. Distinguished Professor of Real Estate and Director of Center for Real Estate
D. Anthony Plath, Associate Professor
Dustin C. Read, Clinical Professor
Judson W. Russell, Clinical Associate Professor
Calvin W. Sealey, Chair and Torrence E. Hemby, Sr., Distinguished Professor in Banking

Weidong Tian, Associate Professor and Distinguished Scholar of Risk Management and Insurance
Louis A. Trosch, Sr., Professor of Business Law

Management

Dennis G Arnold, Associate Professor and Surtman Distinguished Scholar in Business Ethics
Tammy E. Beck, Assistant Professor
Joyce M. Beggs, Associate Professor
Richard M. Conboy, Interim Assistant Dean for Global Programs and Associate Professor
Peter S. Davis, Chair and Professor
I. Edward Jernigan III, Associate Professor
Gary F. Kohut, Professor
James F. Nebus, Assistant Professor
Doug Pugh, Associate Professor
Kelly L. Zellars, Associate Professor

Marketing

Christie H. Amato, Interim Associate Dean for Graduate Programs and Professor
Charles D. Bodkin, Associate Professor
William P. Bray, Part-time Lecturer
Fred H. Campbell, Clinical Professor
Sunil Erelles, Associate Professor
Jared M. Hansen, Assistant Professor
James L. Oakley, Associate Professor
Robert Roundtree, Assistant Professor
Carlos Seraano-Salazar, Part-time Lecturer
Thomas H. Stevenson, Charles E. Cullen Distinguished Professor of Marketing
Linda E. Swayne, Chair and Professor
J. Kevin Toomb, Clinical Professor
Kevin Zheng Zhou, Associate Professor and Reese Distinguished Scholar in International

Accounting

- **Master of Accountancy (MAcc)**

Department of Accounting

259 Friday
704-687-2445
www.macc.uncc.edu

Coordinator

Dr. Alan Blankley

MASTER OF ACCOUNTANCY

The Master of Accountancy program is a multiple track program designed to prepare accountants for the rapidly changing expectations of the accounting profession. The program has three tracks: Professional Accounting, Financial

Accounting/Auditing, and Tax. The program also includes the option for development of an individualized program of study. Completion of the Professional Accounting track or the Financial Accounting/Auditing track will enable students to pursue licensure in states requiring 150 semester hours.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, an acceptable score on the verbal and quantitative portions of the Graduate Management Admission Test is required for graduate study in Accounting.

Degree Requirements

The program leading to the Master of Accountancy degree consists of 30 semester hours (10 graduate classes) of course work. The 30 hours are divided into two components: accounting classes and elective classes. See the track descriptions below for more information on required and elective classes.

A maximum of six hours of transfer credit can be accepted from another accredited business school upon approval by the program coordinator and the Dean of the Graduate School. A 3.0 GPA is required in all courses taken for graduate credit and a maximum of three C's is permitted for continuation in the program. The residence requirement is satisfied by completion of at least three-fourths of the required courses while in residence. Neither a comprehensive examination nor a thesis is required.

Admission to Candidacy Requirements

An Admission to Candidacy form listing graduate-level courses that apply to the degree must be submitted to the Graduate Coordinator one month prior to the semester in which the student plans to complete the course work for the degree.

Assistantships

Assistantships are available on a competitive basis.

Accounting Program Tracks

Professional Accounting Track

The Professional Accounting Track is designed for students who have an interest in preparing for careers in public accounting, consulting, and corporate accounting. The track is designed for students who do not have an undergraduate degree in accounting. It is also designed for students who have an undergraduate degree in accounting from outside of the United States. The program is offered in both full-time and part-time formats with classes offered both during the daytime and in the evenings.

Prerequisite classes:

ACCT 3311 Intermediate Financial Accounting I
ACCT 3312 Intermediate Financial Accounting I
(or equivalents)

The required classes for this track are:

ACCT 5220 Income Tax
ACCT 6120 Taxation of Corporations and Shareholders
ACCT 6160 Advanced Individual Taxation
ACCT 6210 Advanced Accounting Information Systems
ACCT 6220 Financial Statement Auditing
ACCT 6230 Advanced Managerial Accounting
ACCT 6260 Advanced Financial Accounting I
ACCT 6270 Advanced Financial Accounting II

In addition to the required classes, a student is expected to complete two elective classes.

Financial Accounting/Auditing Track

The Financial Accounting/Auditing track is designed for students wishing to pursue careers in public accounting, consulting, and corporate accounting. The track is designed for students who have an undergraduate degree or equivalent in accounting from a U.S. university. The program is offered in both full-time and part-time formats with classes offered both during the daytime and in the evenings.

The required classes for this track are:

ACCT 6120 Taxation of Corporations and Shareholders
ACCT 6160 Advanced Individual Taxation
ACCT 6220 Financial Statement Auditing
ACCT 6260 Advanced Financial Accounting I
ACCT 6270 Advanced Financial Accounting II

In addition to the required classes, a student is expected to complete five elective classes.

Tax Track

The Tax track is designed for students who wish to specialize in taxation. Student can enroll in the Tax track with or without an undergraduate degree in Accounting. The program is offered in both full-time and part-time formats with tax classes offered in only the evenings.

Prerequisite classes:

ACCT 2121 Introduction to Financial Accounting
ACCT 4220/5220 Federal Taxation
(or equivalents)

The required classes for this track are:

ACCT 6110 Tax Research and Planning
ACCT 6120 Taxation of Corporations and Shareholders
ACCT 6130 Taxation of Pass-Through Entities
ACCT 6160 Advanced Individual Taxation

In addition to the required classes a student is expected to complete six elective classes; at least two of those electives must be in taxation or accounting. Electives are available for students who wish to specialize in tax and also prepare for the CPA exam.

Individualized Track

The Individualized Track is designed for students with unique career and professional goals that are not met by the other tracks. Consultation with the Graduate Coordinator is required for this track.

Advising

Prior to, or concurrent with, the start of the first semester of study each student will be expected to complete a program of study listing each class the student expects to take as a part of the program.

Application for Degree

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

Program Certifications/Accreditation

The Belk College of Business and the Department of Accounting are accredited by The Association to Advance Collegiate Schools of Business (AACSB International).

COURSES IN ACCOUNTING

ACCT 5220. Income Tax. (3) An introduction to the Federal income tax system with emphasis on concepts and procedures applicable to all types of entities. *(Fall)*

ACCT 6110. Tax Research and Planning. (3) Tax research techniques applicable to federal tax law affecting individuals, corporations and partnerships, including use of traditional and computerized tax services to solve tax problems. Emphasis on tax planning principles and related tax practice matters, including handling tax compliance issues and dealing with the Internal Revenue Service. *(Fall)*

ACCT 6120. Taxation of Corporations and Shareholders. (3) This course examines the federal and state tax law applicable to corporations and their shareholders. The course covers tax compliance matters, strategies for minimizing tax liabilities and strategies for handling tax controversies. *(Spring)*

ACCT 6130. Taxation of Pass-Through Entities. (3) Tax law applicable to partnerships, Limited Liability Companies and S corporations, including tax compliance matters strategies for minimizing tax liabilities and strategies for handling tax controversies. *(Fall)*

ACCT 6140. Taxation of Estates, Gifts, and Trusts. (3) Wealth transfer taxes and taxation of estates and trusts, including integration of these taxes and tax planning opportunities for minimizing tax liabilities. *(Summer)*

ACCT 6150. Tax Strategy and Policy. (3) Tax strategies in all phases of business operations, including creation of the

business, choice of the type of business entity, financing, operations, distributions to owners, expansion, reorganization and liquidation with emphasis on minimizing taxes and avoiding tax traps. Analysis of business planning cases and completion of a comprehensive project with the results presented in both an oral and written report. *(On demand)*

ACCT 6160. Advanced Individual Taxation. (3) This course focuses on topics related to the taxation of individuals to enable the student to better advise taxpayers on these matters, identify problem areas and assist in tax planning matters to minimize the amount of tax due. Topics include: passive loss limitation rules, interest categorization and limitations, individual alternative minimum tax, individual net operating loss rules and rules concerning divorced taxpayers. *(On demand)*

ACCT 6199. Topics in Taxation. (1-4) This course number designates either special topics classes or independent studies in the area of taxation that go beyond the coverage in other existing courses by either addressing new tax issues or by delving more deeply into a tax topic. *(On demand)*

ACCT 6210. Advanced Accounting Information Systems. (3) Documentation and evaluation of current accounting information systems, evaluation of potential new systems, to extract data from existing systems from analysis, and examination of emerging technologies which have potential uses in accounting information systems. *(Fall)*

ACCT 6220. Financial Statement Auditing. (3) Analysis of the accounting control systems and the independent auditor's examination of the system and other evidence as a basis for expressing an opinion on financial statements. *(Spring)*

ACCT 6230. Advanced Managerial Accounting. (3) Management's use of and need for accounting information, which is necessary for effective managerial decision-making. Emphasis is on understanding managerial accounting information, specifically its purpose, its effect on managerial behavior, and its use in formulating and implementing strategy. Topics include relevant information for activity and process decisions, and issues involved with management control system's design and operation. *(Fall)*

ACCT 6260. Advanced Financial Accounting I. (3) Advanced concepts and practices in financial reporting with special emphasis on the use of accounting information in capital markets and accounting theory and research. In addition, the course will examine current topics and emerging issues in financial reporting. *(Fall)*

ACCT 6270. Advanced Financial Accounting II. (3) Advanced concepts and practices in financial reporting with special emphasis on business combinations, consolidated financial statements and financial reporting issues and practices for governmental and other not-for-profit entities.

In addition, the course will examine current topics and emerging issues in financial reporting. (*Spring*)

ACCT 6299. Topics in Financial Accounting and Auditing. (1-4) This course number designates either special topics classes or independent studies in the area of financial accounting and auditing that go beyond the coverage in other existing courses by either addressing new issues or by delving more deeply into a topic. (*On demand*)

Business Administration

- **Ph.D. in Business Administration**
- **Master of Business Administration (MBA)**
- **Master of Business Administration in Sports Marketing & Management (MBAS)**
- **MBA Plus Post-Master's Graduate Certificate**
- **MBA International Programs**

PH.D. IN BUSINESS ADMINISTRATION

www.belkcollege.uncc.edu/default.asp?id=94

Program Coordinator

Dr. Richard Buttimer

The Ph.D. in Business Administration is a research-oriented program designed to prepare graduates for teaching and research careers in academia. The program includes core courses covering all business specialties combined with an in-depth study in both theoretical and empirical aspects of the major and minor field. Students also receive training in pedagogy. Students are expected to demonstrate mastery of the existing body of knowledge in their major field and to develop new knowledge through original independent research. With the educational background provided by the program, graduates are qualified for tenure-track professor positions at both national and international research and teaching universities and other educational institutions.

Additional Admission Requirements

All applicants seeking admission into the Ph.D. in Business Administration must fulfill the University's general requirements for graduate admission at the Ph.D. level. Additional requirements for admission into the program are listed below.

- 1) A baccalaureate or master's degree in Business, Economics, or a related field with a minimum undergraduate GPA of 3.5 (A=4.0) overall. In the case a candidate presents a master's degree at application, a minimum graduate GPA of 3.25 (A=4.0) on all graduate coursework is required.
- 2) A GMAT score of at least 650 or GRE scores with scores on the quantitative section of at least 700 and on the verbal section of at least 500.
- 3) For non-native speakers of English that do not hold degrees from a US university, a score of 220 on the computer-based TOEFL, a score of 557 on the paper-based TOEFL, or 85% on the MELAB.
- 4) Non-native speakers of English may be required, at the discretion of the Graduate School or the Program Director for the Ph.D. in Business Administration, to enroll in English as a Second Language (ESL) courses at the English Language Training Institute.
- 5) Three positive letters of recommendation, one of which must be from a former professor.
- 6) A Statement of Purpose from the applicant explaining why they wish to pursue a Ph.D. in Business Administration and why they wish to study the specific area to which they are applying.
- 7) To ensure their preparation for doctoral coursework, students may be required to take additional undergraduate or graduate courses, as determined by the Ph.D. in Business Administration Program Committee and the Program Director. Such courses will be specified at the time of admission into the program and may include courses in finance, economics, accounting, marketing, management, operations management, management information systems, mathematics, or statistics.

Students are admitted to the program by the Dean of the Graduate School based on the recommendation of the Belk College of Business Doctoral Program Director, in consultation with the Belk College of Business Doctoral Program Committee. Recommendations are based on the assessments of the Program Director and the Program Committee of the candidate's ability to complete the program, as supported by the application materials. The Program Director, in consultation with the Program Committee, may waive certain requirements if they judge the candidate to be capable of completing the program. If there are more candidates than can be accommodated, candidates are recommended in order of their perceived ability, promise of success, and suitability to the program.

Degree Requirements

The degree of Doctor of Philosophy in Business Administration is awarded for completion of scholarly research that advances knowledge in the field of research. Evidence of this is demonstrated by a successful dissertation defense. Additionally, recipients of this degree must demonstrate mastery of the body of knowledge within their major field and potential for success in future teaching and research.

Students that enter the program must work with the Program Director to develop a Plan of Study during their first two semesters in the program. This Plan of Study will determine the exact coursework that the student must meet in order to be eligible to take the Qualifying Examination. The Plan of Study must meet all Graduate School and Belk College of Business requirements. The Graduate School requires that any student earning a Ph.D. must complete at least 72 post-baccalaureate semester-hours, including at least 18 hours of dissertation credit. Some of these graduate credit hours may include courses taken while enrolled in other graduate programs. It is a Belk College of Business requirement that any program of study within the Ph.D. in Business Administration must contain at least 42 semester-hours of doctoral coursework, regardless of other graduate hours that the student may have previously earned. These 42 semester hours are in addition to the minimum 18 hours of dissertation credit that the Graduate School requires. The Plan of Study must contain a minimum of 18 hours in the major field, a minimum of 15 hours in the minor field, and a minimum of 9 hours in research-support courses.

In addition to the general requirements above, if a student enters the program without a Master's degree, the Plan of Study must include an additional 30 hours of coursework. This coursework must be taken at the graduate level and will generally include courses that are part of the Master of Accountancy, Master of Business Administration, Master of Science in Economics, or Master of Science in Mathematical Finance programs. These 30 hours of additional coursework are subject to the approval of the Program Director.

To ensure that all students are ready for doctoral courses in Business Administration, the program has two distinct sets of prerequisites. First, students entering the program must either demonstrate or attain proficiency in each of the business specialties. Second, students must also demonstrate or attain mathematical proficiency. Students entering the program will be evaluated for these proficiencies by the Program Director. If a student is found to be deficient then the Plan of Study must include appropriate courses, as determined by the Program Director, from the Business Core and Mathematical prerequisites listed below. These courses are in addition to the major, minor, and research support courses.

Business Core

To ensure their preparation for doctoral level coursework in all business specialties, students must demonstrate proficiency in the Business Core. Students may satisfy this requirement either by taking the following courses or by having previously taken equivalent courses:

- MBAD 5112 Foundations of Microeconomics
- MBAD 5113 Foundations of Macroeconomics
- MBAD 5121 Business Information Systems
- MBAD 5131 Accounting & Financial Management
- MBAD 6152 Financial Management
- MBAD 6171 Marketing Management
- MBAD 6194 Global Strategic Management

For the 5000-level courses listed above, graduate or undergraduate courses may count as equivalent courses. For the 6000-level courses listed above, only graduate courses may count as equivalent courses.

Mathematics Prerequisites

The only major available to students enrolled in the Ph.D. in Business Administration program is finance, and all finance students must minor in economics. Finance and economics are mathematically intensive fields. To ensure that students are prepared for doctoral level coursework they are required to have had, at the graduate or undergraduate level, the equivalent of the following courses:

- MATH 1241 Calculus I
- MATH 1242 Calculus II
- MATH 2164 Linear Algebra
- MATH 2241 Calculus III
- MATH 3122/3123 Probability & Statistics

Students lacking these mathematics courses will generally be allowed to take those courses at either the graduate or undergraduate level. At the Program Director's discretion, a student may be permitted to take combined courses to meet multiple prerequisites.

Although unlikely, it is possible that a student may enter the program who has not taken a specific prerequisite or business core course but has, nevertheless, acquired the same skill and technical abilities that the course would convey. In such cases the Program Director may waive the course.

Finance Major Courses

The Plan of Study for a finance major must consist of a minimum of six courses in finance. Normally these courses are:

- BPHD 8200 Financial Economic Theory
- BPHD 8210 Investments & Portfolio Theory
- BPHD 8220 Asset Pricing
- BPHD 8230 Theory of Corporate Finance
- BPHD 8240 Derivatives
- BPHD 8650 Advanced Seminar in Finance

Two of these courses, BPHD 8200 and BPHD 8240, are cross-listed with courses that are part of the Master of Science in Economics and the Master of Science in Mathematical Finance programs. Ph.D. students in these cross-listed courses will be required to complete the master's level requirements of the course and in addition, will be required to take separate exams, prepare a research paper, and complete additional readings. Students that have taken those equivalent courses may, at the discretion of the Program Director, substitute additional sections of BPHD 8650 on their Plan of Study for those courses. In addition, the Program Director may require a student to list BPHD 8650 more than once in their Plan of Study as topics change.

Economics Minor Courses

The Plan of Study for an economics minor must consist of five courses in economics. These courses are:

- BPHD 8100 Microeconomic Theory I
- BPHD 8110 Microeconomic Theory II
- BPHD 8120 Econometrics I
- BPHD 8130 Econometrics II
- BPHD 8140 Econometrics III

Exceptions to the economics minor courses may only be made with the permission of the Ph.D. Program Director.

Research Support Courses

The Ph.D. in Business Administration requires that students have at least nine hours of research support courses in their Plan of Study. For the finance major these research support courses must come from the Department of Mathematics.

These courses are:

- MATH 8202 Partial Differential Equations for Finance
- MATH 8203 Stochastic Calculus for Finance
- MATH 8204 Numerical Methods for Financial Derivatives.

The research support courses are cross-listed with courses used in the Master of Mathematical Finance program. Students that have taken those equivalent courses may, at the discretion of the Program Director, take other mathematics, statistics, economics, finance or related courses in place of the courses specified above.

Grades

A student is expected to earn A's and B's in all courses included in the program of study and must have at least a 3.0 GPA to graduate. The dissertation is graded on a pass/unsatisfactory basis and, therefore, will not be included in the cumulative average. An accumulation of more than two marginal (C) grades will result in suspension of the student's enrollment in the program. If a student earns a grade of U in any course, their enrollment will be suspended and the student cannot take further coursework without being readmitted to the program. Readmission to the program requires approval of the Dean of the Graduate School upon the recommendation of the Program Director.

Teaching Mentor and Pedagogy Training

To ensure that graduates of the program are prepared for a career in both teaching as well as in research, a formal system of pedagogical training is required. Students that enter the program without prior teaching experience will be assigned a faculty Teaching Mentor and will be required to attend a teaching workshop. Most students entering the program will also initially be employed as teaching assistants. Normally after one year in the program students will begin to teach their own sections of undergraduate courses. The combination of mentoring, apprenticeship training through the teaching assistantships, formal pedagogy, and actual instructor experience will allow

students in the program to develop their teaching skills along with their research skills.

Diagnostic Evaluation

Students entering the program will take a diagnostic evaluation at the end of their first full year in the program. The diagnostic examination will be administered by the Program Director, in consultation with the Program Committee. The format of the diagnostic examination will be determined by the Committee, but might consist of a review of the student's work in classes, a written exam, or an oral exam. The purpose of the diagnostic evaluation will be to determine whether the student is making sufficient progress toward the degree. Students that are determined not to be making satisfactory progress toward the degree will be suspended from the program.

Dissertation Advisor and Advisory Committee

Every student in the program must have a Dissertation Advisor and an Advisory Committee prior to being admitted to Candidacy. The student should select a dissertation advisor before the end of the second year of residency. The student and the dissertation advisor jointly determine the advisory committee. The Dissertation Advisor serves as Chair of the Advisory Committee and must be a member of the Graduate Faculty of UNC Charlotte. Normally the Dissertation Advisor for a student majoring in finance will be a member of the Department of Finance. A student may petition the Program Director to allow a member of another Department within the Belk College, or a member of the Mathematics Department, to serve as their Dissertation Advisor. The advisory committee must have at least four members, three of which are chosen by the student. Normally two members will be from the student's major field, and one from the student's minor field. A student may petition the Program Director to allow a member of another Department within the Belk College, or a member of the Mathematics Department to serve on the Committee. The fourth member of the committee will be the Graduate Faculty representative to the Committee. That member will be appointed by the Dean of the Graduate School. All members of the Committee must be members of the UNC Charlotte Graduate Faculty.

Qualifying Examination

Upon completion of all required coursework on their Plan of Study, a student must take the Qualifying Examination. The Qualifying Examination is held once a year during June. Students that have completed their Program of Study must take the qualifying examination the first time that it is offered. The Comprehensive Exam will be a written exam consisting of two four-hour sessions, administered on consecutive days. The intent of the qualifying exam is to test the student's mastery of the body of knowledge in their major, and to demonstrate their familiarity with current research in the field. The qualifying exam will, therefore, cover topics addressed during doctoral coursework, seminars, and in the recent scholarly literature. The qualifying examination will be written and graded by an Examination Committee appointed by the Program

Director. This committee will normally consist of faculty from the student's major, minor, and research support fields.

If a student fails the qualifying exam, they must wait until the following June to retake the exam. During the interim period the student will be required to retake courses in which, in the eyes of the Examination Committee, they have a deficiency. A student failing the qualifying exam a second time will be suspended from the program.

Admission to Candidacy

The dissertation topic may be proposed after the student has passed the Qualifying Examination. Pursuant to Graduate School rules, a doctoral student advances to candidacy after the student's Advisory Committee and the Dean of the Graduate School approve the dissertation topic. Further pursuant to Graduate School rules, candidacy must be achieved at least six months before the degree is conferred.

Dissertation

The student must complete and defend a dissertation based on a research program approved by the student's Dissertation Advisor and Advisory Committee which results in a high-quality, original and substantial piece of research. The student must orally present and defend the dissertation before the Advisory Committee in a defense that is open to the University Community. A copy of the dissertation must be made available to the Graduate Faculty of the Belk College at least three weeks prior to the public defense. While the defense is open to the University Community, the deliberations of the Advisory Committee are held in Executive Session. The dissertation will be graded on a pass/unsatisfactory basis by the Advisory Committee and the Dean of the Graduate School.

The dissertation defense is the final examination. It is a Graduate School requirement that a student that fails the final examination twice will be terminated from the program.

Residency Requirement

The Ph.D. in Business Administration is a full-time program. Normally students must enroll for at least nine credit hours during each semester of the regular academic year (i.e., fall and spring) and at least six hours in the summer semester. Students may petition the Program Director for permission to enroll in less than nine semester hours (six semester hours in summer) in cases of hardship or other emergencies. Students that have passed their Qualifying Examinations must enroll in BPHD 8999 – Doctoral Dissertation Research for at least 9 hours during the fall and spring semester and 6 hours during the summer semester. It is a Graduate School requirement that a student must enroll in at least 18 total hours of Dissertation Research in order to graduate from the program.

Students that have completed all degree requirements, including the Dissertation Defense, may enroll once in

BPHD 9999 – Doctoral Degree Graduate Residency Credit in order to meet Graduate School Residency requirements.

Assistantships

A number of graduate assistantships are available each year for qualified applicants. The Graduate School also has a limited number of fellowships available for highly qualified applicants.

Language Requirement

The program has no foreign language requirement.

Transfer Credit

Only courses with grades of A or B from an appropriate doctoral program at an AACSB accredited school may be accepted for transfer credit. Transfer credit must be approved by the Program Director, and cannot exceed the limit set by the Graduate School.

Time Limit for Degree Completion

The student must achieve candidacy for the Ph.D. degree within six years of enrolling in the program, and the student must complete all degree all requirements within eight years of enrolling in the program. All courses listed on the Plan of Study must also meet Graduate School time requirements.

Application for Degree

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

COURSES IN BUSINESS

ADMINISTRATION

Graduate Only

BPHD 8100. Microeconomic Theory I. (3) Prerequisite: Admission to Ph.D. in Business Administration or Permission of Instructor. Theories of the firm, of the consumer, and of resource owners; determination of prices under different market structures; general equilibrium analysis and welfare economics. (*Fall*)

BPHD 8110. Microeconomic Theory II. (3) Prerequisite: BPHD 8100. Study of game theory, its applications in microeconomic theory and finance, and topics on market equilibrium and market failure. The topics cover simultaneous-move games, dynamic games, analysis of competitive markets, market power, adverse selection and the principal-agent problem. (*Spring*)

BPHD 8120. Econometrics I. (3) Prerequisites: Admission to the Ph.D. in Business Administration or Permission of Instructor. Advanced study of the theory and application of statistics to economic problems. Topics include the derivation of least squares estimators, maximum likelihood

estimation, and problems of multicollinearity, heteroskedasticity, and autocorrelation. (*Fall*)

BPHD 8130. Econometrics II. (3) Prerequisite: BPHD 8120. Advanced course in time series econometrics. The course focuses on time series methods that have become popular and are widely used in applied economics. The course focuses on estimation of univariate and multivariate models (VAR, FAVAR, ECM, and SEM), estimation of dynamic factor models, construction of optimal forecasts and their properties, combination of forecasts. Issues of nonstationarity, cointegration are also examined. (*Spring*).

BPHD 8140. Econometrics III. (3) Prerequisite: BPHD 8130. Advanced study of the econometric methods applicable to financial economic modeling. Examines the predictability of stock market returns, the event study methodology, single factor and multifactor models, basic principles of portfolio theory and portfolio evaluation. The course also covers topics on volatility modeling and fixed-income securities. (*Fall*)

BPHD 8200. Financial Economic Theory. (3) Prerequisites: Admission to Ph.D. in Business Administration or Permission of Instructor. Studies the main themes of financial economics using discrete-time models. Topics include risk measurement, choice under uncertainty, portfolio selection, capital asset pricing model (CAPM), Arrow-Debreu pricing, options and market completeness, the Martingale measure, the arbitrage pricing theory, consumption-based CAPM, and financial structure and firm evaluation. (*Fall*)

BPHD 8210. Investments and Portfolio Theory. (3) Prerequisites: BPHD 8200. Detailed introduction to modern investment and portfolio theory, including asset pricing. Covers standard and non-standard CAPM analysis, APT, stochastic dominance, efficient frontier analysis, optimal portfolio selection, fixed income and bond portfolios, options, futures pricing and evaluation of portfolio performance. The goal of the course is to provide a solid foundation in investments for students who will take further advanced courses in asset pricing. (*Spring*)

BPHD 8220. Asset Pricing. (3) Prerequisites: BPHD 8210. Introduction to multi-period models in finance, mainly pertaining to optimal portfolio choice and asset pricing. The course begins with discrete-time models for portfolio choice and security prices, and then moves to a continuous-time setting. The topics then covered include the Black-Scholes model of asset pricing and some of its extensions, models of the term structure of interest rates, valuation of corporate securities, portfolio choice in continuous-time settings, and finally, general-equilibrium asset pricing models. (*Fall*)

BPHD 8230. Theory of Corporate Finance. (3) Prerequisites: BPHD 8200. The course covers the theory and evidence concerning major corporate financial policy issues including capital structure, payout policy, security design and issuance, capital budgeting, mergers and

acquisitions, agency theory and financial contracting, and the market for corporate control. (*Spring*)

BPHD 8240. Derivatives. (3) Prerequisites: BPHD 8200. Theory and practice of financial derivatives markets including forwards, futures, options and interest rate markets. Topics include the economics of derivatives markets, pricing models for instruments in these markets, strategies for hedging and speculation, as well as regulatory and governance issues. Special attention is placed on the development of pricing models and advanced analytic techniques. (*Fall*)

BPHD 8650. Advanced Seminar in Finance. (3) Prerequisites: Permission of Instructor. This course covers advanced topics in Finance. Topics will vary. May be repeated for credit for different topics. (*On demand*)

BPHD 8999. Doctoral Dissertation Research. (1-9) Prerequisite: Admission to Candidacy for the Ph.D. in Business Administration. Each student will initiate and conduct an individual investigation culminating in the preparation and presentation of a doctoral dissertation. (*On demand*)

BPHD 9999. Doctoral Degree Graduate Residency Credit. (1) Meets Graduate School requirement for continuous enrollment during final term prior to graduation when all course work has been completed. Pass/no credit grading. Credit for this course does not count toward the degree. (*On demand*)

RESEARCH SUPPORT COURSES

MATH 8202. Partial Differential Equations for Finance. (3) Cross-listed as MATH 6202. This course deals with those partial differential equations which are associated with financial derivatives based on factors such as equities and spot interest rates. (*Fall*)

MATH 8203. Stochastic Calculus for Finance. (3) Cross-listed as MATH 6203. An introduction to those aspects of partial differential equations and diffusion processes most relevant to finance, Random walk and first-step analysis, Markov property, martingales and semi-martingales, Brownian motion. Stochastic differential equations: Itô's lemma, backward and forward Kolmogorov equations, the Feynman-Kac formula, stopping times, Hull and White Models, Cox-Ingersoll-Ross Model. Applications to finance including portfolio optimization and option pricing. (*Spring*)

MATH 8204. Numerical Methods for Financial Derivatives. (3) Cross-listed as MATH 6204. This course will introduce students to numerical and computational techniques for solving both European- and American-style financial derivatives. The approach will be the finite difference method and the basic theoretical concepts will be introduced. Final projects will involve implementing the

techniques on computers. Some spectral and Monte Carlo methods will also be discussed. (*Fall*)

MASTER OF BUSINESS ADMINISTRATION (MBA)

www.mba.uncc.edu

Program Directors

Jeremiah Nelson, Interim Director of the MBA and
Director of Professional Student Services
Robin Boswell, Director of MBA Professional Development

The primary objective of graduate study in business is to develop candidates for leadership positions in complex organizations. The MBA program focuses on developing the expertise to lead, influence, and persuade others through effective written and spoken communications; the ability to approach complex problems both systematically and imaginatively; the confidence to make decisions in the face of imperfect information, competing objectives, and technological change; the insight to recognize the ethical dimensions of organizational and individual decisions; the sensitivity to recognize that organizational decisions involve teamwork and consensus-building across diverse groups of individuals; and the awareness that business represents an inherently multinational enterprise that exists without geographical or cultural boundaries.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Business Administration.

- 1) A generally satisfactory undergraduate record from an accredited college or university
- 2) A satisfactory score on the Graduate Management Admission Test (GMAT)
- 3) A full resume or a description of significant work experience

Degree Requirements

The MBA degree program comprises 37 graduate hours, including a Core Functional Component and an Elective Component. Up to 6 hours of course work may be transferred from an AACSB-accredited institution or equivalent, based on a recommendation of the relevant academic department, approval of the Director of the MBA program, and approval of the Graduate School. Necessary preparatory work will be determined during the admissions process, and courses to meet the specific need will be available in the Preparatory Component. All students in the program must meet the Graduate School's requirements for a Master's Degree.

Preparatory Component

Prerequisites (0-13 credit hours) - These courses may be taken after admission to the MBA. These courses are not required prior to admission to the MBA program. Courses in the MBA Preparatory Component must be completed before enrolling in 6000-level courses except by permission of the Director of the MBA program.

- MBAD 5110 Foundations of Economics (3)
- MBAD 5121 Business Information Systems (3)
- MBAD 5131 Fundamentals of Financial Accounting and Financial Management (3)
- MBAD 5141 Business Statistics and Quantitative Analysis (3)
- MBAD 5191 Legal Environment in Business (1)

I. Core Courses (22 credit hours)

- MBAD 6100 Leadership, Ethics and the Business Environment Seminar (1)
- MBAD 6112 Economics of Business Decisions (3)
- MBAD 6131 Management Accounting (3)
- MBAD 6141 Operations Management (3)
- MBAD 6152 Financial Management (3)
- MBAD 6161 Human Behavior in Organizations (3)
- MBAD 6171 Marketing Management (3)
- MBAD 6194 Global Strategic Management (3)

II. Concentration & Elective Component (15 credit hours)

Students complete twelve to fifteen hours of elective courses specified for a concentration or as free electives. Students may enroll in electives as soon as they complete the prerequisites for each course. MBAD 6890 (Directed Individual Study) and MBAD 7090 (Special Topics in Business) may be included in a concentration with permission of the MBA Director and the related Department.

Concentration and elective requirements:

Applied Investments Management

Prerequisite: MBAD 6152

Required courses:

- MBAD 5158 Student Managed Investment Fund I (3)
- MBAD 5159 Student Managed Investment Fund II(3)
- MBAD 6153 Investment Management (3)
- MBAD 6157 Advanced Corporate Finance (3)

Business Finance

Prerequisite: MBAD 6152

Required courses:

- MBAD 6153 Investment Management (3)
- MBAD 6157 Advanced Corporate Finance (3)

Plus two of the following courses:

- MBAD 6151 Financial Institutions and Markets (3)
- MBAD 6154 Applied Business Finance (3)
- MBAD 6155 Multinational Finance (3)

Economics

Prerequisite: Approval of the Department of Economics is required before enrolling in 6000 level ECON courses or the Economics Concentration.

Required courses:

- ECON 6112 Graduate Econometrics (3)
- ECON 6218 Advanced Business & Economic Forecasting (3)
- Plus two additional 6000-level ECON courses (6)

Financial Institutions/Commercial Banking

Prerequisite: MBAD 6152

Required courses:

- MBAD 6153 Investment Management (3)
- MBAD 6156 Commercial Bank Management (3)
- MBAD 6157 Advanced Corporate Finance (3)

Plus one of the following courses:

- MBAD 6151 Financial Institutions and Markets (3)
- MBAD 6155 Multinational Finance (3)

Global Business

Required courses:

- MBAD 6193 Global Business Environment (3)
- MBAD 6197 Managing Multinational Enterprise (3)

Plus one course involving MBA-approved international study or travel (3)

Plus one of the following courses:

- MBAD 6155 Multinational Finance (3)
- MBAD 6174 Global Marketing (3)

Information and Technology Management

Required courses:

- MBAD 6201 Data & Knowledge Management (3)
- MBAD 6202 Business Info Systems Development (3)

Plus two of the following courses:

- MBAD 5121 Business Information Systems (3)
- MBAD 6203 Info Systems Economics, Strategy, & Policy (3)
- MBAD 6204 Business Data Communications (3)

Management

Prerequisite: MBAD 6161

Choose four of the required courses:

- MBAD 6162 Leadership in Organizations (3)
- MBAD 6163 Human Resource Management (3)
- MBAD 6164 Executive Communication (3)
- MBAD 6191 Entrepreneurship (3)
- MBAD 6192 Business Ethics & Corporate Responsibility (3)
- MBAD 6193 Global Business Environment (3)
- MBAD 6197 Managing Multinational Enterprise (3)

Marketing

Prerequisite: MBAD 6171

Required courses:

- MBAD 6172 Marketing Research (3)

MBAD 6173 Promotional Strategy (3)

MBAD 6174 Global Marketing (3)

MBAD 6176 Consumer Behavior (3)

Real Estate Finance & Development

Prerequisite: MBAD 6152

Required courses:

- MBAD 6158 Real Estate Finance & Investment (3)
- MBAD 6159 Real Estate Development (3)

Plus two of the following courses:

- MBAD 6160 Real Estate Capital Markets (3)
- MBAD 6258 Site Feasibility Analysis (3)
- MBAD 6259 Applied Real Estate Development (3)

Supply Chain Management

Prerequisite: MBAD 6141

Required courses:

- MBAD 6122 Technology-Enhanced Decision Making (3)
- MBAD 6142 Quality & Manufacturing Management
- MBAD 6208 Supply Chain Management

Plus one additional approved elective (3)

Student Structured Concentration

Students may propose a 12-semester hour concentration in a significant area of interest for approval by the Director of the MBA program. This concentration may include graduate courses from other programs within the University with approval of the related department.

Admission to Candidacy

An Application for Admission to Candidacy form listing graduate-level courses that apply to the degree must be submitted to the MBA Office four weeks prior to the start of the semester in which the student plans to complete the course work for the degree.

Application for Degree

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

Assistantships

A limited number of assistantships are available each year. In order to be competitive, applications should be submitted by March 15. Additional information is available in the MBA office and the Graduate School website.

Advising

Advising is done by the Director and Associate Director for the MBA Program.

Transfer Credit

Up to six hours of appropriate graduate credit may be accepted for transfer from another AACSB-accredited (or equivalent) MBA program. Only courses where grades of

“B” or better have been earned will be considered. Approval of the Program Director or Associate Director and the Graduate School is also required. All other Graduate School policies regarding transfer credit apply.

Program Certifications/Accreditation

The MBA Program and all degree and certificate programs offered by the Belk College of Business are accredited by the Association to Advance Collegiate Schools of Business (AACSB-International).

MASTER OF BUSINESS ADMINISTRATION IN SPORTS MARKETING AND MANAGEMENT (MBAS)

www.sportsmba.uncc.edu

Program Director

Dr. Linda Swayne

The primary objective for the MBA in Sports Marketing and Management is to develop candidates for leadership positions in sports organizations or those organizations that use sports as a vehicle for another product's (or service's) success. The MBAS program focuses on developing the expertise to lead, influence, and persuade others through effective written and spoken communications; the ability to approach complex problems both systematically and imaginatively; the confidence to make decisions in the face of imperfect information, competing objectives, and technological change; the insight to recognize the ethical dimensions of organizational and individual decisions; the sensitivity to recognize that organizational decisions involve teamwork and consensus-building across diverse groups of individuals; and the awareness that business represents an inherently multinational enterprise that exists without geographical or cultural boundaries. The MBA in Sports Marketing and Management adds to the traditional MBA by focusing on specific coursework that is critically important to sport.

Students enrolled in the program take traditional MBA courses in the first year, four courses in the fall semester and four courses in the spring semester. Two sports marketing courses are required of all students in the first summer session. The following fall semester, students have several elective courses and a capstone course, Sports Strategy. An internship program requirement is fulfilled during the spring and following summer terms. The program is completed in two years.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Business Administration:

- 1.) A generally satisfactory undergraduate record from an accredited college or university.
- 2.) A satisfactory score on the Graduate Management Admission Test (GMAT).
- 3.) A full resume or a description of significant work experience.

The MBAS applicant must meet the criteria for the MBA and submit a letter of application that includes career goals, experience in sport, and why the student is interested in the program. Students meeting the guidelines for acceptance will have individual interviews in Charlotte, North Carolina during the spring semester before the program begins in the summer or fall. Travel to the interview will be at the student's expense. Students without an undergraduate business degree or in need of additional preparatory work will complete the prerequisite classes during the summer before the program begins.

Preparatory Component

Prerequisites (0-9 credit hours) - These courses may be taken after admission to the MBA. These courses are not required prior to admission to the MBA program. Courses in the MBA Preparatory Component must be completed before enrolling in 6000-level courses except by permission of the Director of the MBA program.

- MBAD 5110 Foundations of Economics (3)
- MBAD 5131 Fundamentals of Financial Accounting and Financial Management (3)
- MBAD 5141 Business Statistics and Quantitative Analysis (3)

I. First Year Functional Component (24 hours)

Prerequisites: All requirements for admission to the program and Preparatory Component, except as approved by the MBA Director.

First Year – Fall (12 hours, required)

- MBAS 6300 Sports Law (3)
- MBAD 6161 Human Behavior in Organizations (3)
- MBAD 6209 Management of Service Operations (3)
- MBAD 6131 Management Accounting (3)

First Year – Spring (12 hours, required)

- MBAS 6310 Sports Economics (3)
- MBAD 6152 Financial Management (3)
- MBAS 6320 Internet & Technology in Sports Management (3)
- MBAD 6171 Marketing Management (3)

II. Second Year Focus Component (24 hours)

Students complete 9 hours of required courses, 9 hours of elective courses, and a 6-hour internship. Prerequisites for any of the focus courses are met through the first year required courses. MBAS 6890 (Directed Individual Study) and MBAS 7090 (Contemporary Topics in Sport) may be included in a concentration with permission of the MBA in Sports Director.

Summer I (6 hours, required)

MBAS 6371 Marketing of Sports (3)

MBAS 6372 Marketing through Sports (3)

Second Year – Fall (12 hours)*Required (choose 2 for a total of 3 hours):*

MBAS 6361 Management of Motorsports (1.5)

MBAS 6362 Mgmt of Professional Team Sports (1.5)

MBAS 6363 Mgmt of Individual
Sports/Facilities/Events (1.5)

MBAS 6364 Global Sports (1.5)

Required Capstone Course:

MBAS 6399 Sports Strategy (3)

Electives (choose a combination that totals 6 hours):

MBAS 6373 Professional Selling in Sports (1.5)

MBAS 6374 Negotiations: Agents/Athletes/Sponsors
(1.5)

MBAS 6375 Sports Promotions (1.5)

MBAS 6890 Directed Individual Study (1.5)

MBAS 7090 Contemporary Issues in Sports (1.5)

MBAD 6191 Entrepreneurship (3)

MBAD 6163 Human Resources Management (3)

MBAD 6172 Marketing Research (3)

Second Year – Spring & Summer

MBAS 6400 Internship (6)

Admission to Candidacy

An Application for Admission to Candidacy form listing graduate-level courses that apply to the degree must be submitted to the MBA Office four weeks prior to the start of the semester in which the student plans to complete the course work for the degree.

Application for Degree

An Application for Degree form must be submitted to the Graduate School by the published deadline.

Assistantships

A limited number of assistantships are available each year. In order to be competitive, applications should be submitted by March 15. Additional information is available in the MBA office and the Graduate School website.

Advising

Course advising is done by the Director or Associate Director for the MBA Program; career advising and discussions of employment opportunities are done by graduate MBAS faculty.

Transfer Credit

Up to six hours of appropriate graduate credit may be accepted for transfer from another AACSB-accredited (or equivalent) MBA program. Only courses where grades of "B" or better have been earned will be considered. Approval of the Program Director or Associate Director and the

Graduate School is required. All other Graduate School policies regarding transfer credit apply.

Program Certifications/Accreditation

The MBA Program and all degree and certificate programs offered by the Belk College of Business are accredited by the Association to Advance Collegiate Schools of Business (AACSB-International).

**MBA PLUS POST-MASTER'S
GRADUATE CERTIFICATE**

The MBA PLUS Post-Master's Graduate Certificate program provides an opportunity for graduates of AACSB-accredited MBA programs to broaden and update their business education. As business conditions, tools, and techniques change rapidly, a major way of staying at the forefront of knowledge is through additional university education. The MBA PLUS Certificate makes courses in the Belk College's MBA Concentrations available to persons who already have MBA degrees.

Admission Requirements

Applicants must satisfy the general requirements established by the Graduate School for admission to a graduate certificate program. Applicants must provide two official transcripts indicating the awarding of an MBA degree from an AACSB-accredited institution or equivalent, along with the Graduate application and application fee. (Graduates from the MBA program at UNC Charlotte are not required to send an official transcript.) Applicants will not be required to retake the GMAT.

Completion Requirements

The MBA PLUS Certificate requires completion of twelve or more semester hours of 6000-level courses. At least nine hours must be electives. One 3-hour course may be a repeat of a course previously taken. A student may repeat more courses, but only one such repeated course will be counted toward the certificate. The twelve-hour elective requirement of the MBA PLUS corresponds to the twelve-hour concentrations in the MBA program.

It is expected that most students will use their twelve hours or more to gain a concentration in a particular functional area of interest. However, a broader program that draws from a number of areas may be pursued.

Transfer credits are not accepted in the MBA PLUS Certificate program. To receive the certificate, students must complete all courses with a grade of "B" or better within four years from the time of enrollment in the first certificate course.

An Application for Candidacy for a Graduate Certificate (candidacy form) and an Application for Certificate should

be completed prior to the last semester of MBA PLUS course work. Consult Graduate School published deadlines.

GLOBAL BUSINESS PROGRAMS

The Belk College of Business in partnership with the Graduate School of Business and Leadership (EGADE) at Tec de Monterrey, Mexico offers a dual degree program where a student earns the UNC Charlotte MBA and a Master of Administration from EGADE. The program, all of which is taught in Monterrey Mexico, focuses on global business strategy. The Belk College also offers MBA programs in executive formats in Hong Kong and Taiwan. Courses are taught in English. Students interested in more information about these programs should contact the Global Business Programs Office.

COURSES IN BUSINESS ADMINISTRATION

MBA Program Preparatory Courses

MBAD 5110. Foundation of Economics. (3) This course focuses on topics related to the scope and methodology of economics as a social science, the analysis of markets, the development of market structure, the characteristics of market failure, problems of economic concentration, the measurement of national income, the theory of national income determination, money and banking, monetary and fiscal policy, international economics and the theory of income distribution. Enrollment is limited to admitted MBA students. (*Fall, Spring*)

MBAD 5121. Business Information Systems. (3) Prerequisite: Basic computer knowledge and skills are assumed. Examination of how information systems are developed and used in organizations, how information resources are managed, and the potential strategic and competitive impact information systems have in domestic and global business environments. (*Fall, Spring*)

MBAD 5131. Fundamentals of Financial Accounting and Financial Management. (3) Accelerated and in-depth study of conceptual foundations and applications of financial accounting and financial management with emphasis on building accounting and finance information bases for external decision making. (Accounting and finance preparation to enter the MBA. May not be taken for credit toward any undergraduate degree within the Belk College of Business or used as equivalent credit for ACCT 2121-2122). Enrollment is limited to admitted MBA students. (*Fall, Spring*)

MBAD 5141. Business Statistics and Quantitative Analysis. (3) This course is designed to bring MBA students up to an acceptable level of analytical capability in the areas of probability theory, business statistics, basic linear mathematics (algebra and matrix algebra) and basic

differential and integral calculus. Enrollment is limited to admitted MBA students. (*Fall, Spring*)

MBAD 5191. Legal Environment in Business. (1) Legal environment in which business operates today; Legal, social, and ethical considerations of managers within the framework of federal and state regulatory laws; role and function of federal regulatory agencies and their impact on business activities. Enrollment is limited to admitted MBA students. (*Fall, Spring*)

Graduate Only – General MBA

MBAD 5158. Student Managed Investment Fund I. (3) Cross-listed as FINN 5158. Prerequisites: FINN 3120 or MBAD 6152, and FINN 3222 or FINN/MBAD 6153. Management of an actual portfolio consisting of a portion of the University's Endowment Fund. Admission is by permission of instructor. Students selected for the course are required to take MBAD 5159. (*Fall*)

MBAD 5159. Student Managed Investment Fund II. (3) Cross-listed as FINN 5159. Prerequisites: FINN 3120 or MBAD 6152, and FINN 3222 or FINN/MBAD 6153. Management of an actual portfolio consisting of a portion of the University's Endowment Fund. Admission is by permission of instructor. Student cannot enroll in this course without successfully completing MBAD 5158. (*Spring*)

MBAD 6028. Topics in Business Information Systems. (3) Prerequisite: MBAD 5121 or equivalent. Selected topics in information systems. Potential topics include information resource management, database management systems, management support systems, information systems in the financial and banking industry, information systems in manufacturing, information systems in health care, and EDP auditing. May be repeated for additional credit as the topics vary and with permission of MBA director. (*On demand*)

MBAD 6058. Special Topics in Financial Services. (3) Prerequisite: MBAD 6152. Each year, the subject matter of this course deals with a different specialized and contemporary topic of interest to students who are preparing for management careers in the financial services industry. The topics are chosen and covered in a way that builds on and supplements the topics covered in other courses in the Financial Institutions/Commercial Banking concentration. Emphasis is placed on the managerial implications of the subject matter as well as the impact on the financial system. Topics covered in this course may vary from semester to semester, and the course may be repeated a maximum of one time for academic credit. (*On demand*)

MBAD 6100. Leadership, Ethics, and the Business Environment Seminar. (1) An introduction to leadership, ethics, and other essential skills and concepts for success in the current business environment. The particular topics and activities included will vary each semester as the business

environment changes. This course is to be taken by MBA students in their first semester. *(Fall, Spring)*

MBAD 6111. Macroeconomics and Business Forecasting. (3) Prerequisite: MBAD 5112, 5113, 5141, and 5142 or equivalents. Advanced studies of the interrelations of markets in national and international economies; mechanisms of monetary policy and interest rate effects, foreign exchange rates and inflation; relations between national saving, fiscal policy, foreign debt and investment; short-run and long-run effects of economic policy; tax policy, government spending and economic growth; types of economic forecasts; value and limits of forecasts. *(On demand)*

MBAD 6112. The Economics of Business Decisions. (3) Prerequisites: MBAD 5110 and 5141 or equivalents. Economic concepts in the decision-making process. Topics include scarcity; marginal analysis and tools of optimization; demand and supply analysis and market structure; economic efficiency; regression analysis; risk analysis and game theory; and international issues. *(Fall, Spring)*

MBAD 6122. Decision Modeling & Analysis via Spreadsheets. (3) Prerequisite: MBAD 5141 or equivalent. An analytical approach to the management process. Generalized models for decision making with major emphasis on application of the scientific method to management problems. *(Spring)*

MBAD 6123. Applied Management Science. (3) Prerequisite: MBAD 6122. Mathematical model building aimed at integrating methods and applications. Overview of mathematical programming in practice and a series of projects implementing models in business and the public sector. *(On demand)*

MBAD 6131. Management Accounting. (3) Prerequisite: MBAD 5131 or equivalent. This course deals with using accounting information for strategic, tactical, and operating decisions with a focus on strategic cost management. Emphasis is on using cost and other management accounting information in making sound decisions, its effect on managerial behavior, and its use in formulating and implementing strategy, and issues of design and operation of management control systems including the intended and unintended consequences of performance measurement. *(Fall, Spring)*

MBAD 6141. Operations Management. (3) Prerequisite: MBAD 5141 or equivalent. Design, operation, and control of service and manufacturing systems. Emphasis on using analytical tools for problem solving in process analysis and re-engineering, work-force management, material and inventory management, aggregate planning, total quality management, and others. *(Fall, Spring)*

MBAD 6142. Quality and Manufacturing Management. (3) Prerequisite: MBAD 6141. Current issues and advances in operations management including just-in-time inventory management, total quality management, continuous

improvement, flexible manufacturing systems, computer integrated manufacturing systems, technology evaluation and selection, and operations strategy. *(Fall)*

MBAD 6151. Financial Institutions and Markets. (3) Cross-listed as FINN 6151. Prerequisite: MBAD 6152. Major financial institutions, particularly commercial banks, and their role in the intermediation process and as suppliers of funds to the money and capital markets. Comparative financial policies of these institutions are examined in the context of their legal and market environment. *(Yearly)*

MBAD 6152. Financial Management. (3) Cross-listed as FINN 6152. Prerequisites: MBAD 6112 and MBAD 6131. Theory and practice of corporate finance including asset management, cost of capital and capital budgeting, optimization problems and socio-economic aspects of financial management. Computer technology may be employed when applicable. *(Fall, Spring)*

MBAD 6153. Investment Management. (3) Cross-listed as FINN 6153. Prerequisite: MBAD 6152. Theory and practice of investment decisions of individuals and fund managers. Topics include the status of capital market theory, the efficient market hypothesis literature, and a portfolio performance measurement. Standard institutional and investment analysis topics, futures and options markets, and international investment topics are covered. *(Yearly)*

MBAD 6154. Applied Business Finance. (3) Cross-listed as FINN 6154. Prerequisite: MBAD 6152. Examination of business finance topics which typically confront the firm's primary finance functional areas (CFO, Treasurer, Controller). The purpose is to develop advanced analytical skills in those topic areas. The following topics form the basis of the course: lease vs buy (borrow); leveraged buy-outs; merger analysis (emphasis on valuation); international operations of American firms (capital budgeting and cost of capital); capital structure; risk management. Such additional topics as working capital management; risk management; and relevant current topics will be included as time permits. *(On demand)*

MBAD 6155. Multinational Financial Management. (3) Cross-listed as FINN 6155. Prerequisites: MBAD 6152. Financial management of the multinational firm including management of foreign exchange risk and political risk, and the control and evaluation of financial policies of multinational firms. *(Yearly)*

MBAD 6156. Commercial Bank Management. (3) Cross-listed as FINN 6156. Prerequisite: MBAD 6152. Techniques for the management of commercial banks. Topics of study include industry structure, administrative organization, management of assets, liabilities, and capital, and financial analysis of the banking firm. *(Yearly)*

MBAD 6157. Advanced Corporate Finance. (3) Cross-listed as FINN 6157. Prerequisite: MBAD 6152. Theories of modern corporate finance, including theory of efficient

capital markets; uncertainty and the theory of choice; market equilibrium asset pricing models (capital asset pricing model, arbitrage pricing theory, Black-Scholes); theories of capital structure and the cost of capital; dividend policy; and leasing. *(Yearly)*

MBAD 6158. Real Estate Finance and Investment. (3)
Prerequisite: MBAD 6152. This course focuses on the techniques used to analyze, finance and structure real estate transactions. Topics include: an overview of the real estate space and capital markets; the techniques of financial analysis; project ownership, taxation and financial structure; determining the financial feasibility of real estate development; and corporate real estate strategies. *(Yearly)*

MBAD 6159. Real Estate Development. (3) Cross-listed as GEOG 6103. Examination of the real estate development process. Identification and evaluation of the critical assumptions and issues related to market and site feasibility, financial feasibility, planning, acquisition, construction, and operation of economically viable commercial real estate projects. *(Yearly)*

MBAD 6160. Real Estate Capital Markets. (3)
Prerequisite: MBAD 6152. This course focuses on the techniques used to analyze, finance and structure real estate transactions, and emphasizes the role of the capital markets in facilitating development and investment in commercial real estate. Topics include: real estate in an investment portfolio; valuation and investment analysis for direct (private) real estate equity investment including coverage of valuation using real option methodology; primary and secondary commercial mortgage markets (CMBS); and, analysis of publicly traded equity real estate investment trusts (REITs). *(Yearly)*

MBAD 6161. Human Behavior in Organizations. (3)
Behavioral knowledge and skills essential to becoming an effective manager/leader including behavior and motivation in an environment of complexity and rapid change and ethical implications of actions and their effects on demographically diverse and increasingly international work force. *(Fall, Spring)*

MBAD 6162. Leadership in Organizations. (3)
Prerequisite: MBAD 6161. Continuation of MBAD 6161. Examines performance determinants and appraisal, design of complex organizations, team building, organizational change, career development and conflict management. *(On demand)*

MBAD 6163. Human Resource Management. (3)
Prerequisite: MBAD 6161. An examination of the current critical issues and strategic questions associated with managing employees. Case material, readings and audiovisual material will be used to stimulate discussion of the most important and strategic questions to be tackled by general managers today and in the future in the relationship between management and workers. *(Yearly)*

MBAD 6164. Executive Communication. (3) Intensive study of communication in organizations from middle and upper management perspectives with special attention to corporate communication, media relations, technologically mediated communication, crisis communication and public affairs. Case studies, readings and project assignments will be used in a variety of business situations. *(Yearly)*

MBAD 6171. Marketing Management. (3) Prerequisite: MBAD 6112. A managerial approach to strategic marketing decision-making. Topics include promotional strategy, channels of distribution, demand analysis and pricing, e-marketing, and international marketing. Case studies, readings and simulations are used. *(Fall, Spring)*

MBAD 6172. Marketing Research. (3) Prerequisite: MBAD 6171. Planning, execution and evaluation of marketing research activities. Emphasis on the techniques and methodology used in the collection, analysis and interpretation of economic, demographic and sociological data for use in marketing decision making. *(Fall)*

MBAD 6173. Promotional Strategy. (3) Prerequisite: MBAD 6171. Opportunities and challenges for an organization through advertising, personal selling, sales promotion and publicity. It includes analysis of the legal and ethical problems involved in this area. Case studies and a project assignment are used. *(Spring)*

MBAD 6174. Global Marketing. (3) Prerequisite: MBAD 6171. Study of opportunities, problems and techniques involved in marketing internationally. Analysis of environmental forces which affect international marketing and the methods companies utilize to market effectively on an international scale. *(Spring)*

MBAD 6176. Consumer Behavior. (3) Prerequisite: MBAD 6171. Graduate standing or permission of department. The consumer is the central focus of all business activity. This course is designed (a) to understand people's consumption-related behaviors, and (b) to develop and evaluate marketing strategies to influence those behaviors. Concepts from the behavioral sciences will be analyzed from the perspective of the marketing manager, and will be used to develop dynamic and effective marketing strategies. *(Yearly)*

MBAD 6191. Entrepreneurship. (3) Prerequisites: MBAD 6131, 6152, 6171, or permission of the MBA director. An examination of entrepreneurship and entrepreneurs. Focus on planning the start-up of a fast-growth enterprise with the aim of rewarding the founders and initial investors with significant capital gains. Extensive use of case studies will provide a background of classroom activities to assist students in the preparation of a detailed plan for the hypothetical start-up of a fast-growth firm. *(On demand)*

MBAD 6192. Business Ethics and Corporate Responsibility. (3) Analysis of ethical issues that arise in contemporary business practice, both domestically and

globally. Topics may include ethical issues concerning labor practices, marketing, financial services, environmental practices, human rights, and emerging technologies. Students will be taught to recognize, analyze, and address ethical challenges as they arise in their careers. Consideration will also be given to public policies and global ethics codes that inform business decision making. Case studies are used. *(Yearly)*

MBAD 6193. Global Business Environment. (3)

Prerequisites: MBAD 6152, 6171, or permission of the MBA director. An overview of international business management. Specifically, the functional areas of business are covered to provide an international perspective. *(Fall, Spring)*

MBAD 6194. Global Strategic Management. (3)

Prerequisite: All courses in the primary and intermediate block of the Functional Component or permission of the Director of the MBA program. Examination of the need to integrate the functional activities of the firm in planning corporate objectives and achieving operating results. Emphasis on ability to identify issues and problems of the firm as a whole, to explore alternatives and to make decisions which recognize the interrelationships of the functional specialties within the total organization. Application and integration of knowledge and skills of analysis developed in the preceding courses of the MBA program. *(Fall, Spring)*

MBAD 6195. Strategic Management of Technology. (3)

Prerequisites: MBAD 6141, 6152, and 6171. Impact of changing technology upon industries and companies and the consequent challenges for business managers. Major topics include: the historical context of change and innovation; organization and innovation; technology and business strategy; impact on functional areas; managing linkages; venturing and organization learning; government influence on innovation; executive leadership; the management of innovation and change. A comprehensive written report covering a significant aspect of emerging technology is required. *(On demand)*

MBAD 6196. Strategic Planning. (3) Prerequisite:

Permission of instructor. Strategic planning within a rapidly changing environment including changing industry conditions as well as technological, social, political and economic changes. Examination of strategic planning techniques being developed by researchers and by corporate practitioners. *(On demand)*

MBAD 6197. Managing the Multinational Enterprise. (3)

Prerequisites: MBAD 6152 and 6171. Management challenges associated with the development of international strategies and the management of organizations in business enterprises whose operations stretch across national boundaries; how multinational enterprises (MNEs) work. Case studies, projects, and presentations are used to help students apply concepts and theories. *(Yearly)*

MBAD 6198. Professional Applications. (3) Prerequisites: Completion of the Functional Component. Team-taught, multidisciplinary course based on (1) structured, written cases and (2) contemporary management problems/issues presented in a non-structured, non-case format. Requires formal written position papers evaluating current business problems which are presented and defended before an audience of peers, faculty members, and business leaders. *(On demand)*

MBAD 6201. Data and Knowledge Management in Business. (3) Prerequisite: MBAD 5121 or equivalent.

An overview of the business approach to identifying, modeling, retrieving, sharing, and evaluating an enterprise's data and knowledge assets. Covers the organizational, technological and management perspectives. *(Fall)*

MBAD 6202. Business Information Systems: Analysis, Design, and Management. (3) Prerequisite: MBAD 5121 or equivalent.

Examination of managerial issues associated with the study of business processes and the development of supporting information systems. Emphasis on the application of appropriate methodologies, techniques, and tools to analyze, design, and implement business information systems. Study of relevant IS project management and quality assurance techniques. *(Spring)*

MBAD 6203. Information Systems Economics, Strategy and Policy. (3) Prerequisite: MBAD 5121 or equivalent.

This course examines a collection of topics that deal with the strategic use of information systems. These topics include Business Value of IS, Network Economics, use of IS for competitive advantage, IS Planning and policy setting, IS evaluation selection and sourcing. *(Fall)*

MBAD 6204. Business Data Communications. (3)

Prerequisite: MBAD 5121 or equivalent. Examination of the information communication requirements of business environments, the fundamentals of communication technology, and the application of the technology for solving business problems. Emphasis on understanding communication technologies to assess needs, plan for the introduction of hardware and software, and manage these communication systems. *(Spring)*

MBAD 6207. Business Project Management. (3)

Prerequisites: MBAD 5121 or equivalent and MBAD 6141. Project management is widely used in a variety of business environments to manage complex, non-routine endeavors. Examples of projects include consulting and process improvement projects, advertising projects, and technology projects. This course focuses on tools, techniques, and skills for business project management, with attention to both the quantitative and the qualitative aspects of project management. Major topics include project evaluation, estimation, monitoring, risk management, audit, managing global projects, outsourcing, and project portfolio management. Students will also gain experience using Project Management Software. *(On demand)*

MBAD 6208. Supply Chain Management. (3)
Prerequisites: MBAD 6141; pre- or corequisite: MBAD 6122 or permission of the Department. Supply chain management is concerned with all of the activities performed from the initial raw materials to the ultimate consumption of the finished product. From a broad perspective, the course is designed to examine the major aspects of the supply chain: the product flows; the information flows; and the relationships among supply chain participants. The course content is interdisciplinary in nature and will cover a variety of topics such as supply chain information technologies, supply chain design, strategic alliances between supply chain participants and supply chain initiatives. (*Spring*)

MBAD 6209. Management of Service Operations. (3)
This course focuses on the challenges of managing service operations. The major topics covered are those critical to achieving operational excellence, including the design and delivery of services, service productivity, revenue management, risk management, customer contact management, service quality and customer retention, capacity management, and demand management. The course uses cases, readings, lectures and problem-solving tools to provide students with an understanding of these topics. (*Fall*)

MBAD 6258. Site Feasibility Analysis. (3) Cross-listed as GEOG 6305. Prerequisites: consent of instructor. Examination of factors affecting the feasibility of land parcels for commercial and residential development with emphasis on the physical evaluation of a given site, the market support for its intended use and the financial support for the proposed development. (*Fall*)

MBAD 6259. Applied Real Estate Development. (3)
Cross-listed as GEOG 6105 and ARCH 5069. Prerequisite: MBAD 6159, GEOG 6103, or ARCH 5068. This course focuses on the application of the processes involved in real estate development. Students will work in groups on a semester project to select a site and prepare an appropriate development plan that emphasizes the market and financial feasibility of the real estate development. (*Yearly*)

MBAD 6500. Cooperative Education Experience. (0)
Prerequisite: Completion of nine hours of graduate coursework. Participation in the Co-op program enables MBA students to pursue practical work experience that is complementary to their major course of studies. Each student's program must be approved by the director of the MBA program. Acceptance into the Experiential Learning Program by the University Career Center is required. Participating students pay a course registration fee for transcript notation (49ership and co-op) and receive full-time student status (co-op only). Assignments must be arranged and approved in advance. Course may be repeated; evaluation is Satisfactory/Unsatisfactory. Open only to Master's level students. Ph.D. level students are encouraged to contact their academic department to inquire about academic or industrial internship options for credit.

For more information, contact the University Career Center. (*Fall, Spring, Summer*)

MBAD 6890. Directed Individual Study. (3) Directed individual study and in-depth analysis of a special area of management, economics, business or accounting. The course may be used to satisfy up to six semester hours of graduate credit requirements in the Master of Business Administration degree program and may be repeated for credit provided a different area of study is undertaken each time. Permission of a member of the graduate faculty who would direct the study and permission of the MBA director must be secured before registering for the course. (*Fall, Spring*)

MBAD 7090. Special Topics in Business. (1-4) This course covers special topics in any of the functional areas of business. Topics will vary. May be repeated for credit for different topics. (*On demand*)

MBAD 7999. Master's Degree Graduate Residency Credit. (1) See Department for more information.

Graduate Only – MBA in Sports Marketing & Management

MBAS 6300. Sports Law. (3) The application of law to sport, both professional and amateur, including topics such as Federal antitrust law, employment law, labor law and collective bargaining; constitutional law (especially 1st, 4th, and 14th amendments); in depth analysis of contract law including but not limited to licensing, sponsorship, agency, and broadcast agreements; torts, liabilities, and risk management; and an analysis of Title IX, discrimination. (*Fall*)

MBAS 6310. Sports Economics. (3) Prerequisites: MBAD 5112 and 5113 or equivalent. Economic concepts in the decision-making process as applied to sport. Topics include demand and supply analysis and market structure in sports; market efficiency issues in sports; salary and ticket pricing issues in sports; economic impact studies of sports; and labor market studies in sports including collective bargaining agreements and discrimination. Regression analysis will be covered and used in this course. (*Spring*)

MBAS 6320. Internet and Technology in Sports Management. (3) The course explores the use of information technology in sports management. Technologies used in sports marketing, communicating with and gathering information from fans (e.g., Internet technologies), selling tickets, and supporting managerial decision making (e.g., decision support systems, customer relationship management, data mining, etc.) are examined. Additional topics include security and the use of sports specific software, such as Paciolan. (*Spring*)

MBAS 6361. Management of Motorsport. (1.5)
Prerequisite: MBAD 6161. The application of management concepts and theories to motorsports including leadership, structure, and human resources, especially labor relations.

History of motorsports management including the role and impact of the media. Ownership, governance and governing bodies in motorsports, their authority and functions, eligibility requirements, and sanctions and appeals processes. *(Fall)*

MBAS 6362. Management of Professional Team Sports. (1.5) Prerequisite: MBAD 6161. The application of management concepts and theories to the professional team's franchise including leadership, organizational design, and human resources, especially labor relations. History of professional team sports management in the United States and the world. Ownership, governance and governing bodies in professional sports including league organizations (major and minor), their authority and functions; eligibility requirements, and sanctions and appeals processes. In addition, the role and impact of television on professional team sports management will be explored. *(Fall)*

MBAS 6363. Management of Individual Sports/Facilities/Events. (1.5) Prerequisite: MBAD 6161. History of management of major individual competitive sports such as golf, tennis, boxing; in the United States and the world. Managing the individual athlete and the individual as a brand. Management of sports facilities' finance, design, and operation including tax support, fund raising through bonds, PSLs, luxury boxes and premium seating; ticket sales and concessions; security, and risk management. Managing community, entertainment, and sporting events for success in public and private venues. *(Fall)*

MBAS 6364. Global Sports Management. (1.5) Prerequisites: MBAS 6371 and 6372. Incorporates the marketing and management of international play. Includes the history, growth, and impact of the Olympics, international leagues, and import/export of sports and players/athletes. Additionally, the business environment and the use of sports sponsorship will be explored in the international context. *(Fall)*

MBAS 6371. Marketing of Sports. (3) Prerequisite: MBAD 6171. Marketing concepts and practices applied to the marketing of sports products and services to the sports consumer. Emphasis on strategic marketing planning. Strategies to segment markets and identify customers; generate revenue, fan loyalty, and build the brand; collect and use marketing research data; promotional strategies including endorsements and sponsorships; pricing strategies (ticket prices) for sports teams/individuals in competition. *(Summer)*

MBAS 6372. Marketing through Sports. (3) Prerequisite: MBAD 6171. Using sports to market other products and services for gain through sponsorship, licensing, venue naming, endorsements, and events to leverage brand awareness and loyalty, image and positioning, community responsibility, and employee pride and motivation. Incorporating sports into an integrated marketing plan. *(Summer)*

MBAS 6373. Professional Selling in Sports. (1.5) Prerequisites: MBAS 6371 and 6372. An overview of skills and knowledge involved in individual selling and key account management. Emphasis on sales technique and strategic account management and their applications in the sports industry. Includes managing the ticket sales process and selling sports sponsorships, events, and promotions. *(Fall)*

MBAS 6374. Negotiations: Agents / Athletes / Sponsors. (1.5) Prerequisites: MBAS 6371 and 6372. From management's perspective, negotiating with agents, athletes, owners, and sponsors to achieve win/win and build long-term, profitable relationships. Develop negotiations skills in the context of dealing with the athletes/drivers or the athletes'/drivers' agents and with sponsors or licensees. Considerations to include exclusivity, cost/benefit analysis, loyalty and longevity, switching costs/benefits, fan response and behavior. *(Fall)*

MBAS 6375. Sports Promotions. (1.5) Prerequisites: MBAS 6371 and 6372. An integrated marketing communications (IMC) approach to development of promotional strategy including advertising and media; sales promotions such as give-aways, contests, etc.; personal selling; public relations; and direct marketing. *(Fall)*

MBAS 6399. Sports Strategy. (3) Prerequisite: All first year MBAD and MBAS classes, MBAS 6371, and 6372. An integrative seminar designed to incorporate all skills and knowledge from previous courses in planning corporate objectives to build and sustain competitive advantage in sports and sponsoring organizations. Emphasis on ability to identify issues and problems of the organization as a whole, explore alternatives, and make recommendations. The professional sports manager as ethical decision maker will be incorporated into a variety of case studies that expose students to multiple real-life decision making situations in sport. *(Fall)*

MBAS 6400. Internship in Sports Marketing / Management. (0-6) Prerequisites: MBAS 6399. Internship is the final requirement in the program and allows the student to apply the knowledge gained in the classroom to a structured experience in the sports industry. Students will work full-time for six months (January through June) to gain hands-on experience and to enable them to make a significant contribution to the organization. Individuals with prior experience in sports marketing or management may not be required to do an internship. Pass/No credit. *(Spring, Summer)*

MBAS 6890. Directed Individual Study. (1.5) Prerequisites: MBAS 6371 and 6372. Provides the student an opportunity to work with a faculty member on a specific research topic or to engage in further in-depth study that is not available in current course offerings. A proposal is required and must be agreed to by the faculty member supervising the study before submitting the proposal to the

Director of the Sports MBA program for approval. May be repeated for credit with a change in topic. (*On demand*)

MBAS 7090. Contemporary Topics in Sports. (1.5)

Prerequisites: MBAS 6371 and 6372. The focus will be on a cutting-edge practice, current issue, or significant trend in the sports industry that impacts marketing, financing, managing, or operating the sports enterprise. Topics will vary. May be repeated for credit for different topics. May be repeated for credit with a change in topic. (*On demand*)

Economics

- **M.S. in Economics**

Department of Economics

220 Friday

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Peter M. Schwarz, Professor

Ellen Sewell, Assistant Professor

Dmitry Shapiro, Assistant Professor

Carol Swartz, Clinical Professor

Jennifer L. Troyer, Associate Professor

Hui-Kuan Tseng, Associate Professor

Arthur Zillante, Assistant Professor

Richard A. Zuber, Professor

MASTER OF SCIENCE IN ECONOMICS

The Master of Science degree program in Economics features a curriculum that is flexible yet thorough in its approach to theoretical training and applied course work. The program offers concentrations in Economics and in Economics/Finance. Students completing this program are

prepared for analytical and management positions that require the integration of economic analysis and advanced quantitative methods. Employment opportunities for economists with a master's degree exist in both the public and private sectors. In addition, students with a master's degree may choose to pursue additional graduate education leading to a doctoral degree in Economics or in Finance.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Economics:

- 1) Undergraduate coursework that includes: Calculus, Econometrics (or equivalent), Intermediate Macroeconomic Theory, Intermediate Microeconomic Theory, and Mathematical Economics. (Students missing some of these courses can be admitted conditionally.)
- 2) A satisfactory score on the aptitude portions of the Graduate Record Examination. The Graduate Management Aptitude Test may be substituted for the GRE with the permission of the program coordinator.

Degree Requirements

The program leading to the Master of Science degree in Economics requires at least 30 hours of graduate credit, with a maximum of six hours of transfer credit accepted from an accredited institution. (Credit applied toward an awarded graduate degree will not be accepted as transfer credit.) Courses taken at other accredited institutions after enrollment may receive residence credit if approved by the department and the Dean of the Graduate School. All credit hours applied toward the degree must be in courses open only to graduate students. No more than two C's are permitted in the program and at least 18 semester hours must be completed before admission to candidacy. A GPA of at least 3.0 is required to graduate. The program is organized into three curriculum components:

- 1) a core curriculum in economic theory and quantitative methods
- 2) a concentration to be selected from one of the two described below
- 3) a research project or thesis

Admission to Candidacy Requirements

An Admission to Candidacy form listing graduate-level courses that apply to the degree must be submitted to the program coordinator one month prior to the semester in which the student plans to complete the course work for the degree.

Assistantships

A number of graduate assistantships are available each year. To be fully competitive, applications must be submitted by March 15. Contact the coordinator for further information.

Core Courses

- ECON 6201 Advanced Macroeconomic Theory (3)
- ECON 6202 Advanced Microeconomic Theory (3)
- ECON 6112 Graduate Econometrics (3)
- ECON 6218 Advanced Business and Economic Forecasting (3)

In addition, students who choose to complete a thesis must successfully complete six hours of ECON 6999 (Master's Thesis), while students enrolled in the non-thesis option must complete ECON 6901 and ECON 6902 (Research Methods I and Research Methods II).

Concentrations**1) Economics**

The purpose of the Economics Concentration is to provide students with the opportunity to acquire specialized theoretical skills related to their areas of interest and expertise. This concentration can be completed in one full year of study.

Students in this option must complete the core curriculum for the M.S. in Economics and the thesis or research project. In addition, they must complete 12 hours of electives chosen from the fields of macroeconomics and monetary policy, finance and banking, environmental economics, international trade and international finance, economic modeling and simulation, urban economics, public finance and cost/benefit analysis, or economic and business forecasting. The program also permits the development of individualized specializations in areas that are complementary to economic theory and analysis.

2) Economics/Finance

There are two options available in the Economics/Finance Concentration: (A.) the Financial Management Option and (B.) the Quantitative Finance Option.

A. Financial Management Option

The Financial Management Option is designed for students interested in pursuing careers in corporate finance or financial planning. This option can be completed in one full year of study.

Students in this option must complete the core curriculum for the M.S. in Economics and the thesis or research project. In addition, they must complete:

- FINN 6152 Financial Management (3)
- FINN 6153 Investment Management (3)
- FINN 6157 Theory of Corporate Finance (3)

And one of the following:

- FINN 6155 Multinational Financial Management (3)
- ECON6235 Monetary and Financial Theory (3)
- OR an Approved Elective

B. Quantitative Finance Option

The Quantitative Finance Option is designed for students interested in pursuing careers in portfolio management or

financial risk management. The Quantitative Finance Option can also provide an excellent foundation for students who wish to pursue additional graduate study leading to a doctoral degree in Finance. This option can be completed in one and a half years.

Students in this option must complete the core curriculum for the M.S. in Economics and the thesis or research project. In addition, they must complete:

- ECON 6203 Financial Economic Theory (3)
- ECON 6219 Financial Econometrics (3)
- FINN 6210 Derivatives I: Financial Elements of Derivatives (3)

And one of the following:

- FINN 6211 Risk Management and Fixed Income Derivatives (3)
- ECON 6235 Monetary and Financial Theory (3)
- OR an Approved Elective.

Minors

The Department of Economics also participates in the program leading to an interdisciplinary graduate minor in Operations Research. See Operations Research section of this *Catalog* for complete information and program requirements.

Advising

Prior to, or concurrent with, the first semester of study, each student will be expected to complete a program of study listing each class the student expects to take as a part of the program. The program of study requires the approval of the coordinator.

Thesis

Students who choose the thesis track must successfully complete six hours of ECON 6999 (Master's Thesis). The thesis must be written and defended within six calendar years after admission into the M.S. in Economics program. The Thesis Committee, which must be approved by the program coordinator, will consist of a Chair and at least two other faculty members. ECON 6999 is graded on an A, B, C, or U basis.

Application for Degree

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

Tuition Waivers

A limited number of in-state and out-of-state tuition waivers are made available each year. These waivers are competitively awarded using the same application required for assistantships.

Program Certifications/Accreditations

The Belk College of Business is accredited by the Association to Advance Collegiate Schools of Business (AACSB).

ECONOMICS INTERNATIONAL PROGRAMS

The Belk College of Business in partnership with Copenhagen Business School (CBS) offers a dual degree program in which a student may earn the Belk College MS in Economics with a concentration in Economics/Finance and an MSc in Economics and Business Administration with a concentration in Applied Economics and Finance from CBS. This is a full-time program in which students spend one year at UNC Charlotte and one year at CBS. All courses are taught in English. Students interested in more information about this program should contact the coordinator of the MS in Economics program.

COURSES IN ECONOMICS

ECON 5116. Public Sector Economics. (3) Revenue and expenditure problems of governmental units, intergovernmental financial relationships and the impact of federal fiscal policy upon the American economy. (*On demand*)

ECON 5135. Economics of Growth and Development. (3) Theories of economic growth and development applied to varying economic and social systems. Current theoretical models and their relevance to efficient allocation of resources to both the developed and the developing nations. (*On demand*)

ECON 5160. Economics of Transportation. (3) Analysis of transportation systems. Topics include the historical development of various modes, costs and rate-making, regulation and national transportation policy. (*On demand*)

ECON 5171. Economics of International Trade. (3) Theory of international trade including determination of international trade patterns, welfare implications of international trade, economic integration, and effects of tariffs and quotas. (*On demand*)

ECON 5172. Economics of International Finance. (3) Survey of international monetary theory. Topics include exchange rate determination, balance of payments and adjustment, international liquidity, capital movements, international financial organizations, and monetary reform proposals. (*On demand*)

ECON 5180. Industrial Organization and Public Policy. (3) An examination of monopolistic competition, oligopoly, and monopoly and questions of public policy in dealing

with problems created by industrial concentration. (*Spring, Summer*)

ECON 5181. Energy and Environmental Economics. (3) Economic issues of both energy and environment. Energy issues include the historical development of energy resources, supply and demand considerations, and projections of the future energy balance. Environmental issues are externalities, common property resources, and government regulation. Policy considerations include environmental standards, pollution charges, and property rights. Cost-benefit analysis and microeconomic theory are applied. (*On demand*)

ECON 6001. Advanced Topics in Macroeconomics. (3) Prerequisites: ECON 6112, 6201 and 6202. Advanced treatment of selected issues in macroeconomics. (*On demand*)

ECON 6002. Advanced Topics in Microeconomics. (3) Prerequisites: ECON 6112, 6201 and 6202. Advanced treatment of selected issues in microeconomics. (*On demand*)

ECON 6090. Topics in Economics. (1-3) Prerequisite: permission of the department. Topics from various areas of economics. Credit hours will vary with the topic offered. May be repeated for credit as topics vary. (*On demand*)

ECON 6100. Graduate Mathematical Economics. (3) Economic problems are analyzed with quantitative techniques. Topics covered include the study of economic growth models, utility maximization, homogeneous functions, dynamic systems, applications of linear programming, and constrained optimization. (*On demand*)

ECON 6112. Graduate Econometrics. (3) Prerequisites: Admission to graduate program and permission of program coordinator. Advanced study of the theory and application of statistics to economic problems. Topics include derivation of least-squares estimators; maximum likelihood estimation; and problems of multicollinearity, heteroskedasticity, and autocorrelation. (*Fall*)

ECON 6201. Advanced Macroeconomic Theory. (3) Prerequisites: Admission to graduate program and permission of program coordinator. Theories of aggregate income determination, inflation, unemployment, interest rates and economic growth; macro-economic consumption and investment behavior; the business cycle. (*Fall*)

ECON 6202. Advanced Microeconomic Theory. (3) Prerequisite: Admission to graduate program and permission of program coordinator. Theories of the firm, of the consumer, and of resource owners; determination of prices under different market structures; general equilibrium analysis and welfare economics. (*Fall*)

ECON 6203. Financial Economic Theory. (3) Prerequisites: Admission to the graduate program and

permission of the program coordinator. Review of financial economic theory using discrete-time models. Topics include: risk measurement; choices under uncertainty; portfolio selection; capital asset pricing model (CAPM); Arrow-Debreu pricing; options and market completeness; the Martingale measure; arbitrage theory; consumption based CAPM; and valuation of the firm. *(Fall, Spring)*

ECON 6218. Advanced Business and Economic Forecasting. (3) Prerequisite: ECON 6112. Develops forecasting techniques used in business decision making and techniques used in forecasting macroeconomic variables. Topics include: estimation, identification and prediction using ARMAX, state space, and Box-Jenkins models; spectral analysis; linear filtering. *(Spring)*

ECON 6219. Financial Econometrics. (3) Prerequisite: ECON 6218 or MATH 6201. Advanced time series with financial applications. Topics include: time series regressions (univariate and multivariate, stationary and non-stationary) and time series models (including ARMA, ARCH, GARCH, stochastic volatility and factor models). The emphasis will be on model properties, estimators, test statistics, and applications in finance. *(Fall, Spring)*

ECON 6235. Monetary and Financial Theory. (3) Prerequisites: ECON 6112 and either ECON 6201 or 6202. Theory and empirical tests of money supply, money demand, and financial markets; portfolio theory with special attention to portfolio choices of banks; term structure of interest rates; dynamic models of money and economic activity. *(On demand)*

ECON 6240. Economics of International Finance. (3) Prerequisites: ECON 6112, 6201 and 6202. Open economy macroeconomics, international transmission of inflation and unemployment, internal and external balance; balance of payments and international payments mechanisms; determination of exchange rates and effects of hedging and speculation. *(On demand)*

ECON 6241. Economics of International Trade. (3) Prerequisites: ECON 6112, 6201 and 6202. Examines the causes and consequences of trade using Ricardian and neoclassical models. Considers extensions, modifications, and empirical tests of these models. Analysis of tariffs, quotas, other trade restrictions, export subsidies, and trends in current trade policy. *(On demand)*

ECON 6250. Advanced Urban and Regional Economics. (3) Prerequisite: Admission to graduate program. Applications of microeconomic theory to problems of cities, metropolitan areas and regions; methods in regional analysis, location theory, land-use planning, measurement of economic activity; transportation, housing, poverty, and growth issues. *(Spring)*

ECON 6255. Benefit-Cost Analysis. (3) Principles, practices, and applications for defining and comparing the benefits and costs of public policy programs and private

sector projects, including techniques useful for organizing and analyzing data, evaluating programs systematically, and developing a framework for decision making while recognizing ethical implications, measurement problems, and time value problems. *(On demand)*

ECON 6800. Directed Study in Economics. (1-3) Prerequisite: Admission to graduate program. Independent study of a theoretical and/or a policy problem in a special area of economics. Topics of the investigation may originate from the student or from the faculty member supervising the study. May be repeated for up to 6 hours of credit with the approval of the program coordinator. *(On demand)*

ECON 6901. Research Methods for Economists I. (3) Prerequisites: ECON 6112, 6202 and either ECON 6201 or ECON 6203. Research programs in economics; problem identification; interpretation of statistical results; bibliographic search; data sources and collection; selection of statistical technique; preparation of reports and proposals. *(Spring)*

ECON 6902. Research Methods for Economists II. (3) Prerequisite: ECON 6901. Critique of economic research and reports, presentation of econometric results and reports. The student will develop a research project, perform statistical tests, and present the results orally and in a major research paper. *(Summer)*

ECON 6999. Graduate Thesis Research. (1-6) Individual investigation culminating in the preparation and presentation of a thesis. May be repeated for credit. *(On demand)*

ECON 7999. Master's Degree Graduate Residency Credit. (1) *(Fall, Spring, Summer)*

Real Estate and Development

- Graduate Certificate in Real Estate and Development

GRADUATE CERTIFICATE IN REAL ESTATE AND DEVELOPMENT

The Graduate Certificate in Real Estate and Development requires completion of 15 semester hours (one core and four elective courses) of 6000-level courses in real estate finance

and development. Transfer credits are not accepted into the Graduate Certificate in Real Estate Finance and Development program. Students must earn a “B” or better grade in all 5 courses that make up the certificate program.

This 15-credit certificate program consists of:

Core Requirement:

MBAD 6152 Financial Management (3 credit hours)

Plus 4 of the following 5 courses:

MBAD 6158 Real Estate Finance and Investment (3)
 MBAD 6159 Real Estate Development (3)
 MBAD 6160 Real Estate Capital Markets (3)
 MBAD 6258 Site Feasibility Analysis (3)
 MBAD 6259 Applied Real Estate Development (3)
 ECON 6250 Advanced Urban and Regional Economics (3)

Admissions Requirements

Applicants must possess a graduate (a Master’s or law) degree which provides a foundation for advanced study in finance and real estate development. Other admission requirements include:

- 1) Basic proficiency in using spreadsheet computer software, to be demonstrated by a past project or a certificate from completion of a training course in Excel
- 2) Completion of MBAD 5131 fundamentals of Financial Accounting & Financial Management or its equivalent. A minimum of six years of professional experience is strongly preferred.

Prospective students must submit:

- 1) Graduate School Application for Admission form
- 2) Official transcripts indicating the awarding of an appropriate master’s or law degree
- 3) Official transcripts indicating the awarding of a regionally accredited Bachelor’s degree
- 4) Application fee

Note: Test scores, recommendations letters, etc., are not normally required for admission to the certificate program.

Applications are reviewed on a continuous basis. Participants may enroll for the first time in Fall, Spring, or Summer terms.

GENERAL GRADUATE COURSES IN FINANCE

FINN 5158. Student Managed Investment Fund I. (3) Cross-listed as MBAD 5158. Prerequisites: FINN 3120 or MBAD 6152, and FINN 3222 or FINN/MBAD 6153. Management of an actual portfolio consisting of a portion of the University’s Endowment Fund. Admission is by permission of instructor. Students selected for the course are required to take FINN 5159. (*Fall*)

FINN 5159. Student Managed Investment Fund II. (3) Cross-listed as MBAD 5159. Prerequisites: FINN 3120 or MBAD 6152, and FINN 3222 or FINN/MBAD 6153. Management of an actual portfolio consisting of a portion of the University’s Endowment Fund. Admission is by permission of instructor. Student cannot enroll in this course without successfully completing FINN 5158. (*Spring*)

FINN 6058. Special Topics in Financial Services. (3) Cross-listed as MBAD 6160. Prerequisite: MBAD 6152. Each year, the subject matter of this course deals with a different specialized and contemporary topic of interest to students who are preparing for management careers in the financial services industry. The topics are chosen and covered in a way that builds on and supplements the topics covered in other courses in the Financial Institutions/Commercial Banking concentration. Emphasis is placed on the managerial implications of the subject matter as well as the impact on the financial system. Topics covered in this course may vary from semester to semester, and the course may be repeated a maximum of one time for academic credit. (*On demand*)

FINN 6151. Financial Institutions and Markets. (3) Cross-listed as MBAD 6151. Major financial institutions, particularly commercial banks, and their role in the intermediation process and as suppliers of funds to the money and capital markets. Comparative financial policies of these institutions are examined in the context of their legal and market environment. (*Yearly*)

FINN 6152. Financial Management. (3) Cross-listed as MBAD 6152. Theory and practice of corporate finance including asset management, cost of capital and capital budgeting, optimization problems and socio-economic aspects of financial management. Computer technology may be employed when applicable. (*Fall, Spring*)

FINN 6153. Investment Management. (3) Cross-listed as MBAD 6153. Prerequisite: MBAD 6152. Theory and practice of investment decisions of individuals and fund managers. Topics include the status of capital market theory, the efficient market hypothesis literature, and a portfolio performance measurement. Standard institutional and investment analysis topics, futures and options markets, and international investment topics are covered. (*Yearly*)

FINN 6154. Applied Business Finance. (3) Cross-listed as MBAD 6154. Prerequisite: MBAD 6152. Examination of business finance topics which typically confront the firm’s primary finance functional areas (CFO, Treasurer, Controller). The purpose is to develop advanced analytical skills in those topic areas. The following topics form the basis of the course: lease vs. buy (borrow); leveraged buy-outs; merger analysis (emphasis on valuation); international operations of American firms (capital budgeting and cost of capital); capital structure; risk management. Such additional topics as working capital management; risk management;

and relevant current topics will be included as time permits. *(On demand)*

FINN 6155. Multinational Financial Management. (3) Cross-listed as MBAD 6155. Prerequisites: MBAD 6111 and 6152. Financial management of the multinational firm including management of foreign exchange risk and political risk, and the control and evaluation of financial policies of multinational firms. *(Yearly)*

FINN 6156. Commercial Bank Management. (3) Cross-listed as MBAD 6156. Prerequisite: MBAD 6152. Techniques for the management of commercial banks. Topics of study include industry structure, administrative organization, management of assets, liabilities, and capital, and financial analysis of the banking firm. *(Yearly)*

FINN 6157. Theory of Corporate Finance. (3) Cross-listed as MBAD 6157. Prerequisite: MBAD 6152. Theories of modern corporate finance, including theory of efficient capital markets; uncertainty and the theory of choice; market equilibrium asset pricing models (capital asset pricing model, arbitrage pricing theory, Black-Scholes); theories of capital structure and the cost of capital; dividend policy; and leasing. *(Yearly)*

FINN 6203. Financial Economic Theory. (3) Cross-listed as ECON 6203. Prerequisites: Admission to Graduate Program and Permission of program director. Review of financial economic theory using discrete-time models. Topics include: risk measurement; choices under uncertainty; portfolio selection; capital asset pricing model (CAPM); Arrow-Debreu pricing; options and market completeness; the Martingale measure; arbitrage theory;

consumption-based CAPM; and valuation of the firm. *(On demand)*

FINN 6210. Derivatives I: Financial Elements of Derivatives. (3) Prerequisite: FINN 6152 or equivalent, or permission of Department. Theory and practice of financial derivatives markets including forwards, futures, and options markets. Topics include the economics of derivatives markets, pricing models for instruments in these markets, strategies for hedging and speculation, as well as regulatory and governance issues. *(On demand)*

FINN 6211. Risk Management and Fixed Income Derivatives. (3) Prerequisite: FINN 6210 or permission of Department. Risk management of fixed income portfolios as well as the theory and practice of fixed income markets. Topics include fixed income instruments, term structure models, pricing methods, portfolio management, duration and convexity, securitization, and hedging. *(On demand)*

FINN 6219. Financial Econometrics. (3) Cross-listed as ECON 6219. Prerequisites: ECON 6218 or MATH 6201. Advanced time series with financial applications. Topics covered include time series regressions (univariate and multivariate, stationary and non-stationary) and time series models (including ARMA, ARCH, GARCH, stochastic volatility and factor models). The emphasis will be on model properties, estimators, test statistics, and applications in finance. *(On demand)*



College of Computing and Informatics

www.cci.uncc.edu

Dean: Yi Deng

Associate Dean for Undergraduate Programs and Administration:

Richard A. Lejk

Associate Dean for Research and Graduate Programs: Jing Xiao

Executive in Residence: Olin Broadway

The College of Computing and Informatics at the University of North Carolina at Charlotte is the only school of its kind in the Carolinas. Its mission is an important one – to prepare the information technology professionals of tomorrow through cutting-edge research, education, and partnerships with the community. Students help shape the future by participating in educational programs that respond directly to the needs of government and business. The College of Computing and Informatics is designated as a National Center of Academic Excellence in Information Assurance Education by the National Security Agency. The world of information technology changes rapidly, and the UNC Charlotte College of Computing and Informatics advances the field with its combination of the latest science, industry expertise, and dedicated faculty and students. Hard at work on a full spectrum of research topics, the College of Computing and Informatics has broken new ground in bioinformatics, computer science, computer engineering, information systems, and information technology applications.

Areas of interest to College of Computing and Informatics researchers include 3D HCI, Access Control, Authentication and Identification, Bioinformatics, Biomedical Imaging and Instrumentation, Biomedical Signal Processing, Case-Based Reasoning, Communication Networks, Complex Adaptive Systems, Computational Biophysics, Computational Mass Spectrometry, Computer and Parallel Architecture, Computer Assisted Collaborative Work, Computer Graphics, Computer Integrated Manufacturing, Computer System Engineering, Computer Vision, Context-Aware Software Design, Cryptography and Applications, Data Mining, Enterprise Security, Enterprising Integration, Evolutionary Computation,

Flexible Query Processing, Foundations of Security, Future Proof Security Systems, Genome Annotation, Genome Wide Association Analysis, Haptics, Heuristic Search, High Throughput Data Analysis, Human Computer Interaction, Image/Video Processing, Information Environments, Information Security and Assurance, Information System Personalization, Insider Threat Prevention and Detection, Intelligent Systems, Intrusion Prevention and Detection, Knowledge Based Systems, Knowledge Discovery, Metagenomics, Modeling and Simulation of Information Infrastructure, Modeling for Computer Security, Multi-Agent Systems, Multimedia Databases, Network and Distributed Systems Security, Neural Systems, Neural Networks, Ontological Engineering, Pervasive Security, Privacy Preserving Technology, Provably Secure Systems, Robotics, Scientific and Information Visualization, Secure Electronic Commerce, Secure Information Systems, Secure Peer-to-Peer Computing, Secure Software Engineering, Security Protocols, Semantically Rich Information Systems, Signcryption, Soft Computing, Software Design Patterns and Architectures, Software Design Verification and Validation, Software Process Improvement, Software Requirements Engineering, Software Testing, Structural Bioinformatics, Survivable Security Systems, Systems Biology, Virtual Reality, Vision, Web Security, Wireless Networks, and Wireless Security.

Graduate Degree Programs

- Ph.D. in Information Technology
- Professional Science Master's in Bioinformatics
- Master of Science in Computer Science
- Master of Science in Information Technology

Graduate Non-Degree Programs

- Certificate in Advanced Databases and Knowledge Discovery
- Certificate in Game Design and Development
- Certificate in Information Security and Privacy
- Certificate in Information Technology Management

Bioinformatics & Genomics

- **Ph.D. in Information Technology (Bioinformatics Track)**
- **Professional Science Master's (PSM) in Bioinformatics**

Department of Bioinformatics and Genomics

365 Bioinformatics Building
704-687-8541
www.bioinformatics.uncc.edu

Chair

Dr. Lawrence Mays

Graduate Faculty

Xiuxia Du, Assistant Professor
Anthony Fodor, Assistant Professor
Cynthia Gibas, Associate Professor
Jun-tao Guo, Assistant Professor
Dennis Livesay, Associate Professor
Ann Loraine, Associate Professor
Jessica Schlueter, Assistant Professor
Shannon Schlueter, Assistant Professor
Zhengchang Su, Assistant Professor
Jennifer Weller, Associate Professor

PH.D. IN INFORMATION TECHNOLOGY (BIOINFORMATICS TRACK)

The Department of Bioinformatics and Genomics admits students seeking the Ph.D. degree under the Ph.D. in Information Technology (Bioinformatics Track). All requirements for the Ph.D. in Information Technology are described later in this section of the *Catalog* under the Information Technology heading. The Bioinformatics Track follows all of the common requirements of the Information Technology Ph.D. program with the exceptions stated below.

Bioinformatics Track Requirements

Students will be required to demonstrate competence in the areas of biochemistry, cellular and molecular biology, genetics, statistics, and computer science related to core concepts in bioinformatics. The student's advisor and at least one other dissertation committee member must be faculty in the Bioinformatics track.

Course Requirements

Plans of Study for Bioinformatics Ph.D. students are developed on an individual basis, by the student and his or her advisory committee. However, all students must take the following courses:

- ITSC 8100 Biological Basis of Bioinformatics
- ITSC 8101 Energy and Information in Biological Modeling
- ITSC 8200 Statistics for Bioinformatics
- ITSC 8201 Molecular Sequence Analysis
- ITSC 8202 Computational Structural Biology
- ITSC 8203 Genomics, Transcriptomics, and Proteomics
- ITSC 8110 Introduction to IT Research
- ITSC 8111 Bioinformatics Programming I
- ITSC 8112 Bioinformatics Programming II
- ITSC 8211 Design and Implementation of Biological Databases
- ITSC 8880 Individual Study (lab rotation) (2x)

All students must take ITSC 8699 Graduate Research Seminar every semester until advancing to PhD candidacy (unless they are taking ITSC 8110). Students with exceptionally strong backgrounds in specific disciplines may be excused from one or more of the required didactic classes (except ITSC 8110) at the discretion of the bioinformatics track coordinator.

Qualifying Examination

The Qualifying Examination must be passed prior to 5th semester. The qualifying examination for the bioinformatics track is composed of three components: (i.) written exam, (ii.) oral exam, and (iii.) original written research contribution. The Qualifying Examination Committee will have the same members in any given semester. The written component will have four sections (Molecular Sequence Analysis, Structural Bioinformatics, Functional Genomics, and Research Methods). The material covered by the qualifying exam will be based on material in the required courses listed above. Each student must pass three sections in order to advance; failure to pass three requires that the student attempt the failed sections the following semester. Passed sections carry forward from one exam to the next and three attempts are permitted. After passing the three written sections, students must pass an oral exam on the same topics, for which three attempts are also permitted. Students must pass both the written and oral components of the

exam. (Note: if the written component is passed, but not the oral component, then only the oral component must be retaken.) Students must also prepare an “original written research contribution,” which can be a write-up from a lab rotation (assuming it was given a passing grade), a research paper submitted or published in a journal, etc. Students must pass all components of the qualifying exam by the end of the fifth semester to continue in the program.

Dissertation Proposal

Each student must present and defend a Ph.D. dissertation proposal no more than three semesters after passing the qualifying exam. The proposal defense will be conducted by the student's Dissertation Committee and will be open to the Ph.D. IT faculty and students. At the discretion of the Dissertation Committee, the defense may include questions that cover the student's program of study and background knowledge in the area of the proposal. A student can re-take the proposal defense if he/she cannot pass it the first time. The second failed defense of a dissertation proposal will result in the termination of the student's enrollment in the Ph.D. program.

A doctoral student advances to Ph.D. candidacy after the dissertation proposal has been successfully defended.

For complete details and the required forms, see the sections entitled “Proposal Defense” and “Ph.D. Candidacy” online at www.cci.uncc.edu/coit_new/phd/phd_reqs.cfm.

Dissertation

Each student must complete a research program approved by the student's Dissertation Advisor(s) that yields a high quality, original and substantial piece of research. The Ph.D. dissertation describes this research and its results. The dissertation defense is a public presentation. A written copy of the dissertation must be made available to each member of the student Ph.D. Dissertation Committee, to the Ph.D. Steering Committee, and to the UNC Charlotte Library at least three weeks before the public defense. The date of the defense must be publicly announced at least three weeks prior to the defense. The student must present the dissertation and defend it in a manner accepted by the Dissertation Committee. The dissertation will be graded as pass/fail by the Dissertation Committee and must be approved by the Dean of the Graduate School. A student who fails the defense of a dissertation twice will be terminated from the Ph.D. program.

For complete details and the required forms, see the section entitled “Dissertation” online at www.cci.uncc.edu/coit_new/phd/phd_reqs.cfm.

PROFESSIONAL SCIENCE MASTER'S IN BIOINFORMATICS

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for study toward the Professional Science Masters (PSM) in Bioinformatics:

Under most circumstances, students admitted to the program will have:

- 1) A baccalaureate degree from an accredited college or university in Biology, Biochemistry, Chemistry, Physics, Mathematics, Statistics, Computer Science, or another related field that provides a sound background in life sciences, computing, or both.
- 2) A minimum undergraduate GPA of 3.0 (4.0 scale) and 3.0 in the major.
- 3) A minimum combined score of 1000 on the verbal and quantitative portions of the GRE, and acceptable scores on the analytical and discipline-specific sections of the GRE.
- 4) A combined TOEFL score of 220 (computer-based) or 557 (paper-based) is required if the previous degree was from a country where English is not the common language.
- 5) Positive letters of recommendation.

Degree Requirements

The Professional Science Masters (PSM) in Bioinformatics degree requires a minimum of 37 graduate credit hours, and a minimum of 33 credit hours of formal course work. A minimum of 24 credit hours presented toward a PSM in Bioinformatics must be numbered 6000 or higher. A maximum of 6 hours of graduate credit may be transferred from other institutions.

1. Total hours required. The program requires 37 post-baccalaureate credit hours. Because of the interdisciplinary nature of this program, which is designed to provide students with a common graduate experience during their professional preparation for the PSM in Bioinformatics degree, all students will be required to take a general curriculum that includes a two-year sequence of courses as described below:

2. Core Requirements.

a. Fundamentals Courses

The **Fundamentals** course sequences are intensive graduate-level courses designed to provide accelerated training in a second discipline that complements the student's undergraduate training. Students entering the program are expected to have achieved proficiency in either Biological Sciences or Computing, and to require at most two of the **Fundamentals** courses.

Fundamental Biology track: This course sequence is designed for students entering with a degree in Computer Science or another quantitative science

discipline. The Fundamental Biology course sequence provides accelerated training in Genetics, Cell and Molecular Biology, and Biochemistry for students entering Bioinformatics from computer science or a quantitative science. BINF 6100, 6101.

Fundamental Computing track: The Fundamental Computing track is designed for students entering with a degree in a life science discipline. The Fundamental Computing course sequence provides accelerated training in programming and data structures for students entering Bioinformatics from life sciences. BINF 6111, 6112.

b. Core Bioinformatics Courses

Fundamentals courses prepare students for the required **Core Bioinformatics** courses. Students must take BINF 6200, Statistics for Bioinformatics, and 9 additional credit hours of **Core Bioinformatics** courses, which include four core methods courses, BINF 6201, Molecular Sequence Analysis, BINF 6202, Computational Structural Biology, BINF 6203, Genomics, Transcriptomics & Proteomics, and BINF 6204, Mathematical Systems Biology, as well as two core computational skills courses, BINF 6210, Numerical Methods for Bioinformatics, and BINF 6211, Design and Implementation of Bioinformatics Databases.

c. Professional Preparation Requirement

Students are required to take at least 3 credit hours of electives designed to prepare them to function effectively and ethically in a professional environment. Some recommended electives in this category include PHIL 6050/8050, Research Ethics, and ITIS 6362, Information Technology Ethics, Policy, and Security. Additional elective choices that may fulfill this requirement can be identified by the student and the student's Advisory Committee.

d. The remaining credit hours of formal course work can be completed in additional **Core Bioinformatics** courses and/or other recommended program electives. The student's Advisory Committee will review the student's plan of study each semester.

Bioinformatics Electives: Any courses with BINF numbers, with the exception of **Fundamentals** courses, which require approval, are open to PSM students seeking to complete their coursework requirements.

Recommended Electives offered by other units: A wide range of courses in Biology, Chemistry, Computer Science, Software and Information Systems, and other departments may be appropriate electives for PSM in Bioinformatics students. As course offerings change frequently, the Bioinformatics Program maintains a list of current

recommended electives, which can be found online at www.bioinformatics.uncc.edu.

e. Other requirements

- *Bioinformatics Seminar.* In addition to 33 hours formal coursework, students are required to enroll in the Bioinformatics Program seminar (BINF 6600) for at least one semester (1 credit hour) and to enroll in either an approved internal or external internship (BINF 6400) or a faculty-supervised original research project leading to a thesis (BINF 6900).
- *Grades required.* An accumulation of three C grades will result in suspension of the student's enrollment in the graduate program. If a student makes a grade of U in any course, enrollment in the program will be suspended.
- *Amount of transfer credit accepted.* A maximum of 6 credit hours of coursework from other institutions will count toward the PSM in Bioinformatics degree requirements. Only courses with grades of A or B from accredited institutions are eligible for transfer credit.

COURSES IN BIOINFORMATICS

BINF 6100. Biological Basis of Bioinformatics. (3)

Prerequisites: Admission to graduate standing in Bioinformatics and undergraduate training in Computer Science or other non-biological discipline. Provides a foundation in molecular genetics and cell biology focusing on foundation topics for graduate training in bioinformatics and genomics. (Fall)

BINF 6101. Energy and Information in Biological Modeling. (3)

Prerequisite: Admission to graduate standing in Bioinformatics. This course covers: the major organic and inorganic chemical features of biological macromolecules, the physical forces that shape biological molecules, assemblies and cells, the chemical driving forces that govern living systems, the molecular roles of biological macromolecules and common metabolites, and the pathways of energy generation and storage. Each section of the course builds upon the relevant biology and chemistry to explain the most common mathematical and physical abstractions used in modeling in the relevant context. (Spring)

BINF 6111. Bioinformatics Programming I. (3)

Prerequisites: Admission to graduate standing in Bioinformatics. Students in this course will learn how to use object-oriented programming to solve common problems in bioinformatics. Topics covered will include creation and manipulation of relational databases and interfacing with standard bioinformatics programs such as CLUSTAL, BLAST and HMMer. Emphasis will be placed

on the creation of memory and time efficient algorithms to handle the large data sets of post-genomic biology. *(Fall)*

BINF 6112. Bioinformatics Programming II. (3)

Prerequisite: BINF 6111. This is a continuation of Bioinformatics Programming I (BINF 6111). While the previous course emphasized fundamentals of Bioinformatics programming, this course emphasizes efficiency in speed, data structures and file size. Students will learn how to optimize code and databases so that the demanding analyses of modern biology can be performed in acceptable amounts of time while minimizing hardware requirements. Topics covered will include algorithm optimization, optimization of database queries and parallel processing to allow bioinformatics calculations to be performed on clusters. *(Spring)*

BINF 6200. Statistics for Bioinformatics. (3)

Prerequisite: BINF 6100 and 6111 or equivalents. The aim of this 3-credit course is to introduce students to statistical methods used in further more technical courses. Basic relevant concepts from probability, stochastic processes, information theory, statistics and experimental design will be introduced and illustrated by examples from molecular biology, genomics and population genetics with an outline of algorithms and software. R is introduced as the programming language for homework. *(Fall)*

BINF 6201. Molecular Sequence Analysis. (3)

Prerequisite: BINF 6100 or equivalent. Introduction to bioinformatics methods that apply to molecular sequence. Intro to biological databases online. Sequence databases, molecular sequence data formats, sequence data preparation and database submission. Local and global sequence alignment, multiple alignment, alignment scoring and alignment algorithms for protein and nucleic acids, gene finding and feature finding in sequence, models of molecular evolution, phylogenetic analysis, comparative modeling. *(Fall)*

BINF 6202. Computational Structural Biology. (3)

Prerequisite: BINF 6101, 6201 or equivalents. This course will cover: (a) the fundamental concepts of structural biology (chemical building blocks, structure, superstructure, folding, etc.); (b) software for visualization, visualization styles, publication quality images; (c) the hierarchical nature of biomacromolecular structure classification; (d) computational methods to evaluate and compare biomacromolecular structure; (e) inferring structure/function relationships from structure; and (f) computational prediction of protein and nucleic acid structure from sequence. *(Fall)*

BINF 6203. Genomics, Transcriptomics & Proteomics. (3)

Prerequisite: BINF 6100 or equivalent, and BINF 6201. This course surveys the application and interpretation of high-throughput molecular biology and analytical biochemistry methods used to produce the kinds of high-volume biological data most commonly encountered by

bioinformaticians. The relationship between significant biological questions, modern biotechnology methods, and the bioinformatics solutions that enable interpretation of complex data is emphasized. Topics include: Genome sequencing and assembly, genome annotation, genome comparison. Genome evolution. Function prediction and gene ontologies. Microarray assay design, data acquisition, data analysis. Proteomics and methods and data analysis. Methods for identification of molecular interactions. Metabolic databases, pathways and models. *(Spring)*

BINF 6204. Mathematical Systems Biology. (3)

Prerequisites: BINF 6200 and 6210 or equivalents. Introduction to concepts and common methods in systems biology. The class emphasizes molecular networks, models and applications, and covers the following topics: complexity and robustness of cellular systems; hierarchy and modularity of molecular interaction networks; biologically data acquisition for system level modeling; introduction to systems biology markup language (SBML); Bayesian inference of biological systems; stoichiometric and constraint-based modeling; modeling molecular interaction networks with nonlinear ordinary differential equations; quantitative approaches to the analysis of genetic regulatory networks; stochastic modeling of intracellular kinetics; multilevel modeling. *(Spring)*

BINF 6210. Numerical Methods in Bioinformatics. (3)

Prerequisites: Ability to program in a high-level language (Perl, Java, C#, Python, Ruby, C/C++). Calculus. This course will focus on mathematically complex problems and show students how to implement efficient numerical methods to solve those problems. The focus on the class will depend on instructor expertise but may include: applying linear models and principal component analysis to analysis of microarrays, application of ordinary and partial differential equations to modeling cellular pathways, applying Markov Chains to gene finding and gene predictions algorithms and application of stochastic models and Monte Carlo simulations to molecular dynamics and protein folding. *(Fall)*

BINF 6211. Design and Implementation of

Bioinformatics Databases. (3) Prerequisite: BINF 6111 and 6112 or equivalent. Students will acquire skills needed to exploit public biological databases and establish and maintain personal databases that support their own research; such skills include learning underlying data models and the basics of DBMS, and SQL. Particular topics will include formats and schemas in important bioinformatics databases (Genbank, EMBL, PDB), XML schema and XML exchange methods, using CGI for the query interface, using generic database tools to browse and manage databases (Tomcat and Padmin), relevant database applications of SOAP and CORBA, the types of models used in designing databases, and how ontologies (such as GO) affect database design and queries. *(Spring)*

BINF 6310. Analysis of Microarray Data. (3) This course focuses on recent literature concerning algorithms for analysis of microarray data. The course will start with a review of normal statistics (t-test, ANOVA, etc.) and their non-parametric, robust equivalents. We then turn to primary literature for a survey of the techniques of analyzing microarray data: background subtraction, normalization across samples, assignment of p-values, evaluation of algorithms on control data sets, clustering algorithms, self organizing maps, bootstrap estimations of significance and over-representation of gene ontology terms. Special attention will be given to the problem of appropriate correction of significance for multiple measurements. Students should have fluency in a high-level programming language (PERL, Java, C# or equivalent) and will be expected in assignments to manipulate and analyze large public data sets. The course will utilize the R statistical package with the bioconductor extension. *(On demand)*

BINF 6311. Biophysical Modeling. (3) This course will cover: (a) overview of mechanical force fields; (b) energy minimization; (c) dynamics simulations (molecular and coarse-grained); (d) Monte-Carlo methods; (e) systematic conformational analysis (grid searches); (f) classical representations of electrostatics (Poisson-Boltzmann, Generalized Born and Colombic); (g) free energy decomposition schemes; and (h) hybrid quantum/classical (QM/MM) methods. *(On demand)*

BINF 6312. Computational Comparative Genomics. (3) Prerequisite: BINF 6210 or equivalent. Computational methods for comparative genomics analysis. The course covers the following topics: the architecture of prokaryotic and eukaryotic genomes; the evolutionary concept in genomics. databases and resources for comparative genomics; principles and methods for sequence analysis; evolution of genomes; comparative gene function annotation; evolution of the central metabolic pathways and regulatory networks; genomes and the protein universe; cis-regulatory binding site prediction; operon and regulon predictions in prokaryotes; regulatory network mapping and prediction. *(On demand)*

BINF 6313. Structure, Function, and Modeling of Nucleic Acids. (3) Prerequisite: BINF 6100-6101 or equivalent. The course covers the following topics: atomic structure, macromolecular structure-forming tendencies and dynamics of nucleic acids; identification of genes which code for functional nucleic acid molecules, cellular roles and metabolism of nucleic acids; 2D and 3D abstractions of nucleic acid macromolecules and methods for structural modeling and prediction; modeling of hybridization kinetics and equilibria; hybridization-based molecular biology protocols, detection methods and molecular genetic methods, and the role of modeling in designing these experiments and predicting their outcome. *(On demand)*

BINF 6400. Internship Project. (1-3) Prerequisites: Admission to graduate standing in Bioinformatics. Project chosen and completed under the guidance of an industry partner, which results in an acceptable technical report. *(Fall, Spring)*

BINF 6600. Seminar. (1) Prerequisites: Admission to graduate standing in Bioinformatics. Departmental seminar. Weekly seminars will be given by bioinformatics researchers from within UNCC and across the world. *(Fall, Spring)*

BINF 6601. Journal Club. (1) Prerequisites: Admission to graduate standing in Bioinformatics. Each week, a student in the class is assigned to choose and present a paper from the primary bioinformatics literature. *(Fall, Spring)*

BINF 6900. Masters' Thesis. (1-3) Prerequisites: Twelve graduate credits and permission of instructor. Project chosen and completed under the guidance of a graduate faculty member, which results in an acceptable master's thesis and oral defense. *(On demand)*

ITSC 8100. Biological Basis of Bioinformatics. (3) Prerequisites: Admission to graduate standing in Bioinformatics and undergraduate training in Computer Science or other non-biological discipline. Provides a foundation in molecular genetics and cell biology focusing on foundation topics for graduate training in bioinformatics and genomics. *(Fall)*

ITSC 8101. Energy and Information in Biological Modeling. (3) Prerequisites: Admission to graduate standing in Bioinformatics. This course covers: the major organic and inorganic chemical features of biological macromolecules, the physical forces that shape biological molecules, assemblies and cells, the chemical driving forces that govern living systems, the molecular roles of biological macromolecules and common metabolites, and the pathways of energy generation and storage. Each section of the course builds upon the relevant biology and chemistry to explain the most common mathematical and physical abstractions used in modeling in the relevant context. *(Spring)*

ITSC 8111. Bioinformatics Programming I. (3) Prerequisites: Admission to graduate standing in Bioinformatics. Students in this course will learn how to use object-oriented programming to solve common problems in bioinformatics. Topics covered will include creation and manipulation of relational databases and interfacing with standard bioinformatics programs such as CLUSTAL, BLAST and HMMer. Emphasis will be placed on the creation of memory and time efficient algorithms to handle the large data sets of post-genomic biology. *(Fall)*

ITSC 8112. Bioinformatics Programming II. (3) Prerequisite: ITSC 8111. This is a continuation of Bioinformatics Programming I (ITSC 8111). While the

previous course emphasized fundamentals of Bioinformatics programming, this course emphasizes efficiency in speed, data structures and file size. Students will learn how to optimize code and databases so that the demanding analyses of modern biology can be performed in acceptable amounts of time while minimizing hardware requirements. Topics covered will include algorithm optimization, optimization of database queries and parallel processing to allow bioinformatics calculations to be performed on clusters. *(Spring)*

ITSC 8200. Statistics for Bioinformatics. (3)

Prerequisite: ITSC 8100 and 8111 or equivalents. The aim of this 3-credit course is to introduce students to statistical methods used in further more technical courses. Basic relevant concepts from probability, stochastic processes, information theory, statistics and experimental design will be introduced and illustrated by examples from molecular biology, genomics and population genetics with an outline of algorithms and software. R is introduced as the programming language for homework. *(Fall)*

ITSC 8201. Molecular Sequence Analysis. (3)

Prerequisite: ITSC 8100 or equivalent. Introduction to bioinformatics methods that apply to molecular sequence. Intro to biological databases online. Sequence databases, molecular sequence data formats, sequence data preparation and database submission. Local and global sequence alignment, multiple alignment, alignment scoring and alignment algorithms for protein and nucleic acids, gene finding and feature finding in sequence, models of molecular evolution, phylogenetic analysis, comparative modeling. *(Fall)*

ITSC 8202. Computational Structural Biology. (3)

Prerequisite: ITSC 8101, 8201 or equivalents. This course will cover: (a) the fundamental concepts of structural biology (chemical building blocks, structure, superstructure, folding, etc.); (b) software for visualization, visualization styles, publication quality images; (c) the hierarchical nature of biomacromolecular structure classification; (d) computational methods to evaluate and compare biomacromolecular structure; (e) inferring structure/function relationships from structure; and (f) computational prediction of protein and nucleic acid structure from sequence. *(Fall)*

ITSC 8203. Genomics, Transcriptomics & Proteomics. (3)

Prerequisite: ITSC 8100 or equivalent, and ITSC 8201. This course surveys the application and interpretation of high-throughput molecular biology and analytical biochemistry methods used to produce the kinds of high-volume biological data most commonly encountered by bioinformaticians. The relationship between significant biological questions, modern biotechnology methods, and the bioinformatics solutions that enable interpretation of complex data is emphasized. Topics include: Genome sequencing and assembly, genome annotation, genome comparison. Genome evolution. Function prediction and

gene ontologies. Microarray assay design, data acquisition, data analysis. Proteomics and methods and data analysis. Methods for identification of molecular interactions. Metabolic databases, pathways and models. *(Spring)*

ITSC 8204. Mathematical Systems Biology. (3)

Prerequisites: ITSC 8200 and 8210 or equivalents. Introduction to concepts and common methods in systems biology. The class emphasizes molecular networks, models and applications, and covers the following topics: complexity and robustness of cellular systems; hierarchy and modularity of molecular interaction networks; biologically data acquisition for system level modeling; introduction to systems biology markup language (SBML); Bayesian inference of biological systems; stoichiometric and constraint-based modeling; modeling molecular interaction networks with nonlinear ordinary differential equations; quantitative approaches to the analysis of genetic regulatory networks; stochastic modeling of intracellular kinetics; multilevel modeling. *(Spring)*

ITSC 8210. Numerical Methods in Bioinformatics. (3)

Prerequisites: Ability to program in a high-level language (Perl, Java, C#, Python, Ruby, C/C++). Calculus. This course will focus on mathematically complex problems and show students how to implement efficient numerical methods to solve those problems. The focus on the class will depend on instructor expertise but may include: applying linear models and principal component analysis to analysis of microarrays, application of ordinary and partial differential equations to modeling cellular pathways, applying Markov Chains to gene finding and gene predictions algorithms and application of stochastic models and Monte Carlo simulations to molecular dynamics and protein folding. *(Fall)*

ITSC 8211. Design and Implementation of

Bioinformatics Databases. (3) Prerequisite: ITSC 8111 and 8112 or equivalent. Students will acquire skills needed to exploit public biological databases and establish and maintain personal databases that support their own research; such skills include learning underlying data models and the basics of DBMS, and SQL. Particular topics will include formats and schemas in important bioinformatics databases (Genbank, EMBL, PDB), XML schema and XML exchange methods, using CGI for the query interface, using generic database tools to browse and manage databases (Tomcat and Pgdadmin), relevant database applications of SOAP and CORBA, the types of models used in designing databases, and how ontologies (such as GO) affect database design and queries. *(Spring)*

ITSC 8310. Analysis of Microarray Data. (3) This course focuses on recent literature concerning algorithms for analysis of microarray data. The course will start with a review of normal statistics (t-test, ANOVA, etc.) and their non-parametric, robust equivalents. We then turn to primary literature for a survey of the techniques of analyzing microarray data: background subtraction, normalization

across samples, assignment of p-values, evaluation of algorithms on control data sets, clustering algorithms, self organizing maps, bootstrap estimations of significance and over-representation of gene ontology terms. Special attention will be given to the problem of appropriate correction of significance for multiple measurements. Students should have fluency in a high-level programming language (PERL, Java, C# or equivalent) and will be expected in assignments to manipulate and analyze large public data sets. The course will utilize the R statistical package with the bioconductor extension. *(On demand)*

ITSC 8311. Biophysical Modeling. (3) This course will cover: (a) overview of mechanical force fields; (b) energy minimization; (c) dynamics simulations (molecular and coarse-grained); (d) Monte-Carlo methods; (e) systematic conformational analysis (grid searches); (f) classical representations of electrostatics (Poisson-Boltzmann, Generalized Born and Colombic); (g) free energy decomposition schemes; and (h) hybrid quantum/classical (QM/MM) methods. *(On demand)*

ITSC 8312. Computational Comparative Genomics. (3) Prerequisite: ITSC 8210 or equivalent. Computational methods for comparative genomics analysis. The course covers the following topics: the architecture of prokaryotic and eukaryotic genomes; the evolutionary concept in genomics. databases and resources for comparative genomics; principles and methods for sequence analysis; evolution of genomes; comparative gene function annotation; evolution of the central metabolic pathways and regulatory networks; genomes and the protein universe; cis-regulatory binding site prediction; operon and regulon predictions in prokaryotes; regulatory network mapping and prediction. *(On demand)*

ITSC 8313. Structure, Function, and Modeling of Nucleic Acids. (3) Prerequisite: ITSC 8100-8101 or equivalent. The course covers the following topics: atomic structure, macromolecular structure-forming tendencies and dynamics of nucleic acids; identification of genes which code for functional nucleic acid molecules, cellular roles and metabolism of nucleic acids; 2D and 3D abstractions of nucleic acid macromolecules and methods for structural modeling and prediction; modeling of hybridization kinetics and equilibria; hybridization-based molecular biology protocols, detection methods and molecular genetic methods, and the role of modeling in designing these experiments and predicting their outcome. *(On demand)*

ITSC 8600. Seminar. (1) Prerequisites: Admission to graduate standing in Bioinformatics. Departmental seminar. Weekly seminars will be given by bioinformatics researchers from within UNCC and across the world. *(Fall, Spring)*

ITSC 8601. Journal Club. (1) Prerequisites: Admission to graduate standing in Bioinformatics. Each week, a student

in the class is assigned to choose and present a paper from the primary bioinformatics literature. *(Fall, Spring)*

Computer Science

- M.S. in Computer Science
- Graduate Certificate in Advanced Databases and Knowledge Discovery
- Graduate Certificate in Game Design and Development

Department of Computer Science

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Larry Hodges, Adjunct Professor
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Robert Kosara, Assistant Professor
Aidong Lu, Assistant Professor
Taghi Mostafavi, Associate Professor
Jamie Payton, Assistant Professor
Zbigniew Ras, Professor
William Ribarsky, Bank of America Endowed Professor
Min Shin, Associate Professor
Richard Souvenir, Assistant Professor
K.R. Subramanian, Associate Professor
Yu Wang, Assistant Professor
Zachary Wartell, Assistant Professor
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Barry Wilkinson, Professor
Dale-Marie Wilson, Assistant Professor
Wensheng Wu, Assistant Professor
Jing Xiao, Professor
Jing Yang, Assistant Professor
Michael Youngblood, Assistant Professor

MASTER OF SCIENCE IN COMPUTER SCIENCE

The objective of the computer science Master of Science program is to provide students advanced skills and knowledge in planning, design, implementation, testing, and management of computer systems and applications. These skills form a good foundation for doctoral study, research, or teaching in computer science. These abilities are needed for those individuals holding related technical or managerial positions, as they provide the expertise to solve computer system problems in government, business, and industry.

The active research areas in the Department of Computer Science include 3D HCI, Bioinformatics, Biomedical Imaging and Instrumentation, Biomedical Signal Processing, Communication Networks, Computer and Parallel Architecture, Computer Game Design, Computer Graphics, Computer System Engineering, Computer Vision, Data Mining, Evolutionary Computation, Flexible Query Processing, Grid Computing, Haptics, Heuristic Search, Image/Video Processing, Intelligent Systems, Knowledge Based Systems, Knowledge Discovery, Multimedia Databases, Music Information Retrieval, Neural Systems, Neural Networks, Robotics, Scientific and Information Visualization, Soft Computing, Virtual Reality, Vision, and Wireless Networks.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, students applying for this program are expected to have knowledge of two higher languages, data structures, algorithm analysis, computer organization and architecture, and two additional senior level computer science courses in systems and/or applications. Also, knowledge of calculus, discrete mathematics, and linear algebra are required. Students without all the above undergraduate prerequisites in computer science and mathematics may need additional coursework after entering the program, as determined by the Department.

A bachelor's degree in a high quality computer science program or satisfactory completion of the Advanced GRE in Computer Science may be substituted for some or all of the subject area admission requirements. Individuals who have worked at a high professional level in the computer industry may be able to substitute work experience for some of the specific subject area requirements, subject to review by the Department Graduate Committee.

Students must have an undergraduate grade point average of (or equivalent to) at least 2.8 (on a 4.0 point scale) and a junior/senior GPA of at least 3.0. A satisfactory score on the aptitude portion of the GRE is also required.

Early-Entry Program

Exceptional undergraduate students at UNC Charlotte may be accepted into the Master of Science in Computer Science and begin work toward a graduate degree before completion of the baccalaureate degree. The criteria for admission are the following:

- 1) A student may be accepted into the Early-Entry Program at any time after completion of 75 semester hours of undergraduate work applicable to the appropriate degree, although it is expected that close to 90 hours will have been earned by the time the first graduate course is taken.
- 2) The application process and all required documentation (e.g., test scores, transcripts, letters of recommendation) are the same for early entry students as for other applicants to the program. Admission must be recommended by the Department of Computer Science and approved by the Graduate School. The admission status will be "provisional" pending the award of the undergraduate degree.
- 3) To be accepted into this program an undergraduate student must have at least a 3.2 overall GPA and a minimum 3.3 GPA in the Department of Computer Science.
- 4) If an early-entry student has not met the normal admission requirements of a 2.8 overall undergraduate GPA and a 3.0 junior-senior GPA at the end of his/her baccalaureate degree, she/he will be dismissed from the graduate program.
- 5) Students accepted into an early-entry program will be subject to the same policies that pertain to other matriculated graduate students. Generally, it will be assumed that early-entry students will finish their baccalaureate degrees before they complete 15 hours of graduate work.
- 6) This early-entry program is also accelerated in which up to 12 hours earned at the graduate level may be substituted for required undergraduate hours. In other words, up to 12 hours of graduate work may be "double counted" toward both the baccalaureate and graduate degrees.

Degree Requirements

The Master of Science program in Computer Science requires 30 graduate credit hours, which may optionally include 6 hours of thesis. At least 21 hours of the courses applied to the degree must be from the Department of Computer Science. At least 15 hours must be 6000 level or above courses. No more than 6 hours may be in Individual Study. A maximum of 6 hours of graduate credit may be transferred from other institutions.

I. Core Requirement

All students must take two courses* from the Core Category:

ITCS 5102 Survey of Programming Languages

ITCS 5141 Computer Organization and Architecture –or–
 ITCS 6182 Advanced Computer Architecture
 ITCS 6112 Software System Design and Implementation
 ITCS 6114 Algorithms & Data Structures

**The two courses taken to satisfy the core requirement must each be passed with an “A” or a “B” grade.*

II. Breadth Requirements

All students must take three courses, each from a different Course Category, to satisfy the breadth requirements.

Course Categories:

- *Data Management*
 ITCS 6155 Knowledge Based Systems
 ITCS 6157 Visual Databases
 ITCS 6160 Database Systems
 ITCS 6161 Advanced Topics in Database Systems
 ITCS 6162 Knowledge Discovery in Databases
 ITCS 6163 Data Warehousing
- *Networked Systems*
 ITCS 5145 Parallel Computing
 ITCS 5146 Grid Computing
 ITCS 6132 Modeling & Analysis of
 Communication Networks
 ITCS 6166 Computer Networks
 ITCS 6167 Advanced Networking Protocols
 ITCS 6168 Wireless Communications
- *Visualization and Computer Graphics*
 ITCS 5120 Introduction to Computer Graphics
 ITCS 5121 Information Visualization
 ITCS 5122 Visual Analytics
 ITCS 5123 Visualization and Visual
 Communication
 ITCS 6124 Illustrative Visualization
 ITCS 6126 Large Scale Information Visualization
 ITCS 6127 Real-time Rendering Engines
 ITCS 6128 3D Display and Advanced Interfaces
 ITCS 6140 Data Visualization
- *Intelligent & Interactive Systems*
 ITCS 5152 Computer Vision
 ITCS 6050 Topics in Intelligent Systems
 ITCS 6111 Evolutionary Computation
 ITCS 6125 Virtual Environments
 ITCS 6134 Digital Image Processing
 ITCS 6150 Intelligent Systems
 ITCS 6151 Intelligent Robotics
 ITCS 6156 Machine Learning
 ITCS 6158 Natural Language Processing
 ITCS 6267 Intelligent Information Retrieval
- *Applications (includes all application area specific courses such as Medical Informatics, and Game Design)*

ITCS 5133 Numerical Computation Methods &
 Analysis
 ITCS 5230 Introduction to Game Design &
 Development
 ITCS 5231 Advanced Game Design &
 Development
 ITCS 5232 Game Design and Development
 Studio
 ITCS 5235 Game Engine Construction
 ITCS 5236 AI for Computer Games
 ITCS 5237 Audio Processing for Entertainment
 Computing
 ITCS 6153 Neural Networks
 ITCS 6159 Intelligent Tutoring Systems
 ITCS 6165 Coding and Information Theory
 ITCS 6222 Biomedical Signal Processing
 ITCS 6224 Biomedical Image Processing
 ITCS 6226 Bioinformatics
 ITCS 6228 Medical Informatics

III. Area of Concentration

Each student must take at least three related courses (9 hours) to form an area of concentration. The area of concentration may differ from the Course Categories; students are encouraged to have their areas of concentration aligned with faculty research areas. The three courses forming the student's area of concentration must have the written approval of the student's academic advisor. Only one breadth course can be included in the area of concentration courses. Core courses cannot be used in area of concentration. At least two of the three courses forming an area of concentration should be from the Department of Computer Science. The three courses taken to satisfy the concentration requirement must each be passed with an “A” or a “B” grade.

Minimum Background Requirements for Admission

Applicants to MS program in Computer Science must have had a computing background equivalent to two years of undergraduate training in Computer Science, including at least an introductory course on programming, a course on data structures, and a course either in operating systems or computer architecture. In addition, background in Mathematics to include courses in Linear Algebra or Statistics, Discrete Mathematics, and at least one year of Calculus is also required. Students without sufficient background in Computer Science or Mathematics may be admitted to the Program but must complete background courses determined by the MS Program Director in the first year.

Assistantships

Financial assistance for qualified students is available on a competitive basis in the form of graduate teaching and research assistantships. Students that are awarded assistantships are expected to choose the thesis option. The deadline for graduate teaching assistantship applications is February 15 for the following academic year. For detailed and updated information, refer to the Computer Science

website.

Minor in Operations Research

The Department of Computer Science participates in the program leading to an interdisciplinary graduate minor in Operations Research. See the Operations Research listing under the College of Liberal Arts & Sciences section of this *Catalog* for complete information and program requirements.

GRADUATE CERTIFICATE IN ADVANCED DATABASES AND KNOWLEDGE DISCOVERY

Program of Study

The purpose of this certificate is to provide graduate students with the opportunity to reach a demonstrated level of competence in the areas of databases and knowledge discovery. Course-work towards this graduate certificate can be used for credit towards the MS degree in Computer Science. However, its primary objective is to provide a well-defined target for students who want to advance their knowledge of modern databases and knowledge discovery techniques, but do not necessarily wish to complete all requirements for the M.S. degree in Computer Science. The certificate may be pursued concurrently with any of the graduate degree programs at UNC Charlotte.

Additional Admission Requirements

This certificate program is open to all students who hold a BS degree in any scientific, engineering, or business discipline and either:

- 1) are enrolled and in good standing in a graduate degree program at UNC Charlotte
- OR**
- 2) have a GPA above 2.8 overall and 3.0 Jr/Sr

Applicants are required to submit a brief (one-to-two page) statement of educational and work experience in the computing field. Application for the ADKD certificate program is made through the Office of Graduate Admissions. (*Note: the admission process for the Certificate is separate from the admission process for the MS degree.*)

Completion Requirements

The certificate will be awarded upon completion of five graduate level courses (15 credits) in the area of knowledge discovery and databases. A cumulative GPA of 3.0 will be required and at most one course with a grade of C may be allowed towards the certificate.

To obtain the certificate, a student needs to take: ITCS 6150 or ITCS 6114; ITCS 6160; ITCS 6162; and two additional courses.

For detailed and updated information, please look online at www.cci.uncc.edu/cs/site/certif.cfm.

GRADUATE CERTIFICATE IN GAME DESIGN AND DEVELOPMENT

Program of Study

The purpose of the GDD certificate is to provide graduate students with the opportunity to reach a demonstrated level of competence in game design and development. Course-work towards the certificate in GDD can be used towards the Master's degree in Computer Science. However, its primary purpose is to provide a well-defined target for students who want to advance their knowledge of modern game design and development techniques and work with a variety of professionals, from artists to writers, to bring the vision for an interactive game or media product to life. The certificate may be pursued concurrently with any of the graduate degree programs at UNC Charlotte.

Additional Admission Requirements

The certificate in GDD is open to all students who hold a Bachelor's degree in any scientific, engineering or business and either:

- Are enrolled and in good standing in a graduate degree program at UNC Charlotte or
- Have a GPA above 2.8 overall and 3.0 Jr/Sr.

In addition, the program expects a current working knowledge of two higher level languages, including at least one procedural language, and a familiarity with computer applications. The following minimal background in mathematics is compulsory: two semesters of calculus and one semester of discrete structures. Individuals who have worked at a high professional level in the computer industry may be able to substitute work experience for specific subject area admission requirements. Application for the GDD certificate program is made through the Graduate Admissions Office of the University.

Courses used to satisfy requirements of a previous degree are not acceptable. Students with significant game-related work at the undergraduate level may be allowed to substitute advanced game courses for compulsory courses at the discretion of the GDD certificate coordinators. (*Note: the admission process for the Certificate is separate from the admission process for the MS degree.*)

Completion Requirements

The certificate will be awarded upon completion of five graduate level courses (15 credits) in the area of game design and development. The cumulative GPA must be at least 3.0 and at most one course with a grade of C may be allowed toward the certificate. Course substitutions may be made at the discretion of the GDD Certificate Coordinators.

To obtain the certificate a student needs to:

1. Take the following four compulsory courses:
 - ITCS 5230 Introduction to Game Design and Development
 - ITCS 5231 Advanced Game Design and Development
 - ITCS 5232 Game Design and Development Studio
 - ITCS 5120/6120 Computer Graphics
2. Take one elective course from the following:
 - ITCS 5235 Game Engine Construction
 - ITCS 5236 Artificial Intelligence for Computer Games
 - ITCS 5237 Audio Processing for Entertainment Computing
 - Another game-related course (generally from ITCS/ITIS at the 5000 level or above) approved by the GDD coordinators.

COURSES IN COMPUTER SCIENCE

ITCS 5010. Topics in Computer Science. (3)
Prerequisite: permission of department. Topics in computer science selected to supplement the regular course offerings. A student may register for multiple sections of the course with different topics in the same semester or in different semesters. *(On demand)*

ITCS 5102. Survey of Programming Languages. (3)
Prerequisite: permission of department. Study of the concepts underlying various computer languages, and comparing and evaluating various language features. History and development of various languages, such as FORTRAN, ALGOL, PASCAL, MODULA-2, C, C++, Ada, Lisp, Smalltalk, Prolog.; evaluation and comparison of various algorithms and language suitability. Selection of languages for problems/environments. Overview of various languages. *(On demand)*

ITCS 5120. Introduction to Computer Graphics. (3)
Prerequisites: ITCS 2214 and MATH 2164 or permission of department. Graphics hardware; raster algorithms; geometric transformations; 2D/3D interactive graphics; 3D viewing and perspective projections; color and lighting models; hidden surface removal; modeling hierarchies; fractals; curved surfaces. *(Spring, Fall) (Evenings)*

ITCS 5121. Information Visualization. (3) Prerequisite: graduate standing. Information visualization concepts, theories, design principles, popular techniques, evaluation methods, and information visualization applications. *(Spring) (Evenings)*

ITCS 5122. Visual Analytics. (3) Prerequisites: any of STAT 1220, 1221, 1222, 2122, or 2223, or approval of the instructor. This course introduces the new field of visual analytics, which integrates interactive analytical methods and visualization.. Topics include: critical thinking, visual reasoning, perception/cognition, statistical and other analysis techniques, principles of interaction, and applications. *(Fall) (Evenings)*

ITCS 5123. Visualization and Visual Communication. (3)
Prerequisites: none. Understanding the relatively technical field of visualization from the point of view of visual communication, this course draws connections with photography, design, illustration, aesthetics, and art. Both technical and theoretical aspects of the various fields are covered, and the connections between them are investigated. *(Spring) (Evenings)*

ITCS 5128. Programming Languages and Compilers. (3)
Prerequisite: permission of department. Introduction to the concepts and techniques used in describing, defining, and implementing programming languages and their compilers. Introduction to parsing and parser construction; LL and LR grammars; syntax directed translation; data object representations; run time structures; intermediate languages; code optimization. *(On demand)*

ITCS 5133. Numerical Computation Methods and Analysis.(3) Prerequisite: ITCS 2214 and either MATH 1120 or MATH 1241. Introduction to principles and techniques behind numerical methods and algorithms that underlie modern scientific and engineering applications. Roots of equations; linear systems (direct methods, LU/QR factorization, iterative methods); Eigen values and vectors; Interpolation, Approximation; Numerical Differentiation/Integration, ODEs and PDEs. *(On demand)*

ITCS 5141. Computer Organization and Architecture. (3)
Prerequisite: ITCS 3182 or equivalent. Fundamentals of computer design; instruction set design, basic processor implementation techniques; pipelining; memory hierarchy; input/output. Cost/performance and hardware/software trade-offs. *(Fall, Alternate years) (Evenings)*

ITCS 5145. Parallel Computing. (3) Prerequisites: ITCS 1215 and 3182 or permission of department. Types of parallel computers, programming techniques for multiprocessor and multicomputer systems, parallel strategies, algorithms, and languages. *(Once every three semesters)*

ITCS 5146. Grid Computing. (3) Prerequisite: ITCS 1215 or graduate standing. Grid computing software components, standards, web services, security mechanisms, schedulers and resource brokers, workflow editors, grid portals, grid computing applications. *(Once every three semesters)*

ITCS 5152. Computer Vision. (3) Prerequisites: ITCS

1215 or MATH 2164, or permission of department. General introduction to Computer Vision and its application. Topics include low-level vision, 2D and 3D segmentation, 2D description, 2D recognition, 3D description and model-based recognition, and interpretation. *(Odd years, Fall) (Evenings)*

ITCS 5157. Computer-Aided Instruction. (3) Prerequisite: permission of department. History of CAI; study of current CAI systems; development of man-machine dialogue; programming tools for CAI; information structures for computer-oriented learning. Advantages/disadvantages/costs of CAI. *(On demand)*

ITCS 5161. Intellectual Property Aspects of Computing. (3) Prerequisite: Graduate standing. This course explores the broad field of intellectual property and the many aspects related to computing. Topics covered include software copyrights, software patents, trademarks and service marks, employment contracts, non-compete agreements, software licenses, software development contracts, preservation of digital evidence, protection of trade secrets, cyberspace law and the use of mediation in IP disputes. *(Spring)*

ITCS 5181. Microcomputer Interfacing. (3) Prerequisite: ITCS 3182 or equivalent, or permission of the Department. Signal conditioning, A/D conversion, noise, transmission line effects, signal processing, D/A conversion and serial/parallel interfaces. *(On demand)*

ITCS 5230. Introduction to Game Design and Development. (3) Prerequisite: ITCS 2215 or equivalent, or permission of the instructor. Basic concepts and techniques for electronic game design and development. Topics include: game history and genres, game design teams and processes, what makes a game fun, level and model design, game scripting and programming including computer graphics and animation, artificial intelligence, industry issues, and gender and games. *(Fall)*

ITCS 5231. Advanced Game Design and Development. (3) Prerequisite: ITCS 5230. Advanced concepts and techniques for electronic game design and development. This course is a project-centered course where students explore complex gameplay and interactivity. This course explores topics from the introductory course in more depth, such as: applying software engineering techniques to developing games, advanced game programming and scripting, networking, graphics, physics, audio, game data structures and algorithms, and artificial intelligence. *(Spring)*

ITCS 5232. Game Design and Development Studio. (3) Prerequisite: ITCS 5120, ITCS 5231, and permission of instructor. Application of advanced concepts and techniques for electronic game design and development. Teams will use engineering techniques to incorporate game programming and scripting, networking, graphics, physics, audio, game data structures and algorithms, and artificial intelligence

into an electronic game. Individuals will develop a complete portfolio of prior work and the class project. *(Spring, Even years) (Evenings)*

ITCS 5235. Game Engine Construction. (3) Prerequisite: ITCS 5120 or permission of department. Introduction to principles and techniques behind modern computer and console game engines. Graphics Rendering Pipeline (transformations, lighting, shading); 2D/3D Texture Mapping; Image Based Rendering; Spatial Data Structures and Acceleration Algorithms; Level of Detail; Collision Detection, Culling and Intersection Methods; Vertex/Pixel Shaders; Pipeline Optimization; Rendering Hardware. *(Spring, Odd years) (Evenings)*

ITCS 5236. Artificial Intelligence for Computer Games. (3) Prerequisite: ITCS 6150 or permission of instructor. Application of advanced concepts and techniques in artificial intelligence for electronic game design and development. An investigation of the artificial intelligence techniques necessary for an agent to act, or appear to act, intelligently in interactive virtual worlds. Topics include uncertainty reasoning, machine learning, perception, knowledge representation, search, and planning. Emphasis will be on implementation and experimentation with the goal of building robust intelligent agents in interactive entertainment domains. Elements of multi-agent collaboration and the use of cognitive architectures in interactive computer games will also be discussed. *(On demand)*

ITCS 5237. Audio Processing for Entertainment Computing. (3) Prerequisites: MATH 1242, MATH 2164, and ITCS 6114 or equivalents. Introduction to the principles and applications of audio (digital signal) processing focusing on entertainment domains. Topics include: analysis of signals, transforms, digital filter design techniques, audio engine development, file encoding/decoding, spatial sound rendering, optimization, and advanced audio techniques. *(On demand)*

ITCS 6010. Topics in Computer Science. (3) Prerequisite: permission of department. Topics in computer science selected to supplement the regular course offerings. A student may register for multiple sections of the course with different topics in the same semester or in different semesters. *(On demand)*

ITCS 6050. Topics in Intelligent Systems. (3) Prerequisite: permission of department. Topics in intelligent systems selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITCS 6080. Topics in Computer Engineering. (3) Prerequisite: permission of department. Topics in computer engineering selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITCS 6107. Formal Languages and Automata. (3)

Prerequisites: one semester of discrete structures or permission of department. Detailed study of abstract models for the syntax of programming languages and information processing devices. Languages and their representation; grammars; finite automata and regular sets; context-free grammars and pushdown automata; Chomsky Hierarchy; closure properties of families of languages; syntax analysis. *(On demand)*

ITCS 6110. Topics in Programming Languages and Compilers. (3) A continuation of material in ITCS 5128 with emphasis on advanced aspects of optimization, data flow analysis, and error discovery. *(On demand)*

ITCS 6111. Evolutionary Computation. (3) Prerequisite: ITCS 6114 or permission of department. General introduction to optimization problems. Optimization techniques: hill climbing, simulated annealing, evolution strategies, and genetic algorithms. Evolution programming techniques. *(Even years, Spring) (Evenings)*

ITCS 6112. Software System Design and Implementation. (3) Cross-listed as ITIS 6112. Prerequisite: permission of department. Introduction to the techniques involved in the planning and implementation of large software systems. Emphasis on human interface aspects of systems. Planning software projects; software design process; top-down design; modular and structured design; management of software projects; testing of software; software documentation; choosing a language for a software system. *(Fall, Spring) (Evenings)*

ITCS 6114. Algorithms and Data Structures. (3) Prerequisite: full graduate standing. Introduction to techniques and structures used and useful in design of sophisticated software systems. Records; arrays; linked lists; queues; stacks; trees; graphs; storage management and garbage collection; recursive algorithms; searching and sorting; graph algorithms; time and space complexity. *(Fall, Spring) (Evenings)*

ITCS 6115. Advanced Topics in Algorithms and Data Structures. (3) Prerequisite: ITCS 6114. Continuation and extension of ITCS 6114. String matching; semi numerical algorithms; probabilistic algorithms; parallel algorithms; NP-completeness; computationally hard problems; approximation algorithms. *(On demand)*

ITCS 6120. Computer Graphics. (3) Prerequisites: full graduate standing or permission of department. Introduction to the design and implementation of interactive graphics systems. Raster and vector display systems, I/O devices; graphics primitives and their attributes; raster algorithms and clipping; 2D/3D geometric transformations; 3D viewing and projections; hierarchical and procedural models; surface representation; color and lighting models; rendering algorithms; global illumination and texture mapping. *(Fall) (Evenings)*

ITCS 6124. Illustrative Visualization. (3) Prerequisite: ITCS 4120 or ITCS 5120. This course focuses on advanced concepts and techniques related to the design, implementation, integration, and management of illustrative visualization and computer graphics. Topics include various advanced visualization topics: feature extraction, non-photorealistic rendering, point-based rendering, hardware-accelerated rendering, segmentation, image generation, animation, evaluation, design, and interaction. *(Spring) (Evenings)*

ITCS 6125. Virtual Environments. (3) Prerequisite: Graduate Standing. This course will cover the current state of the art in the design and implementation of Virtual Environments. Topics covered will include: position tracking, design of head-traced and head-mounted displays, stereoscopic display, presence in virtual environments, 3D user interface design, and applications of VEs. Previous experience in computer graphics or 3D game design is helpful but not required. *(On demand)*

ITCS 6126. Large Scale Information Visualization. (3) Prerequisite: ITCS 4121 or ITCS 5121 Information Visualization. Concept, theory, design principles, data processing techniques, and visual metaphors and interaction techniques for massive, multi-dimensional, multi-source, time-varying information exploration. *(Fall) (Evenings)*

ITCS 6127. Real-Time Rendering Engines. (3). Prerequisite: ITCS 5120 or ITCS 6120. This course focuses on advanced concepts and techniques employed in building real-time rendering systems that support a high level of realism as well as handle large geometric models. Topics include: modern graphics hardware, programmable shaders, shadow and environment mapping, image-based modeling and rendering, large data models (simplification, level of detail), high quality interactive rendering. *(On demand)*

ITCS 6128. 3D Display and Advanced Interfaces. (3). Prerequisite: ITCS 4120 or ITCS 6120. The course covers the fundamentals of 3D display hardware and software technology. Topics include: human visual spatial perception of natural and synthetic 3D images, 3D display hardware, human computer interface algorithms for effective stereoscopic display, 3D display rendering techniques. *(On demand)*

ITCS 6130. Advanced Computer Graphics. (3) Prerequisite: ITCS 6120 or equivalent, or permission of department. Implicit and parametric representation; cubic surfaces; advanced reflection models; global illumination models - ray tracing, radiosity; shadow algorithms, texture mapping; volumetric modeling and rendering techniques; animation; advanced modeling techniques; particle systems, fractals. *(On demand)*

ITCS 6132. Modeling and Analysis of Communication Networks. (3) Prerequisite: A course in communication

networks or permission of department. The objective of this course is to develop an understanding of modeling and analysis techniques for communication systems and networks. The intent is to enable the student to understand how to comparatively analyze the cost and performance impact of network architecture and protocol design decisions. Modeling techniques for analytical analysis, simulation based analysis, and measurement based analysis will be presented. Concepts covered include validation/verification of models, workload characterization, metric selection, presentation and interpretation of results. A semester long analysis project will be undertaken. *(Fall, Even years)*

ITCS 6134. Digital Image Processing. (3) Cross-listed as ECGR 6118. Prerequisite: full graduate standing or permission of department. Image perception; image types/applications; image restoration and enhancement; edge/boundary detection; image transformation; image segmentation; statistical and syntactical pattern recognition; image information measures and compression. *(Even years, Spring) (Evenings)*

ITCS 6140. Data Visualization. (3) Prerequisite: full graduate standing or permission of department. Emphasis on the methodology and application of data visualization to scientific and engineering data; data types and models; visualization methods; volume visualization; scalar, vector and tensor fields; multi-variate visualization; visualization systems and models; visualization applications; visualization software and hardware; research issues; and future trends. *(On demand)*

ITCS 6144. Operating Systems Design. (3) Prerequisite: ITCS 6114 or permission of department. Introduction to features of a large-scale operating system with emphasis on resource-sharing environments. Computer system organization; resource management; multiprogramming; multi-processing; file systems; virtual machine concepts; protection and efficiency. *(On demand)*

ITCS 6148. Advanced Object-Oriented Systems. (3) Cross-listed as ITIS 6148. Prerequisite: ITCS 6112 or equivalent. This course focuses on issues related to the design, implementation, integration, and management of large object-oriented systems. Topics include: object models, object modeling, frameworks, persistent and distributed objects, and object-oriented databases. *(On demand)*

ITCS 6150. Intelligent Systems. (3) Prerequisite: full graduate standing or permission of department. To introduce core ideas in AI. Heuristic versus algorithmic methods; problem solving; game playing and decision making; automatic theorem proving; pattern recognition; adaptive learning; projects to illustrate theoretical concepts. *(Fall) (Evenings)*

ITCS 6151. Intelligent Robotics. (3) Prerequisites: ITCS

1215 and MATH 2164, or permission of department. General introduction to spatial descriptions and transformations, and manipulator position and motion. More study on robot planning, programming, sensing, vision, and CAD/CAM. *(Odd years, Spring) (Evenings)*

ITCS 6153. Neural Networks. (3) Prerequisites: ITCS 6114. Topics include: basic notions and models of artificial neural nets; single layer neural classifiers; multilayer one-way neural nets; single layer feedback networks; neural models of associative memory; self organizing neural nets; translation between neural networks and knowledge bases; applications of neural networks. *(On demand)*

ITCS 6154. Heuristic Search. (3) Prerequisite: ITCS 6150. Heuristics and problem representation; heuristic-search procedures; formal properties and performance analysis of heuristic methods; game-searching strategies and heuristic programming; search with probabilities; knowledge-guided search. *(On demand)*

ITCS 6155. Knowledge-Based Systems. (3) Prerequisite: ITCS 6162 or permission of department. Knowledge systems; knowledge discovery; association rules; query languages and operational semantics; decision systems; cooperative and collaborative systems; tree structured information systems; tree structured query languages; flexible query answering; chase algorithm based on rules; local and global ontologies; action rules; optimization problems for query answering systems. *(Spring) (Evenings)*

ITCS 6156. Machine Learning. (3) Prerequisite: ITCS 6150 or permission of department. Machine learning methods and techniques including: acquisition of declarative knowledge; organization of knowledge into new, more effective representations; development of new skills through instruction and practice; and discovery of new facts and theories through observation and experimentation. *(On demand)*

ITCS 6157. Visual Databases. (3) Prerequisites: ITCS6160 or equivalent. Topics include: representation of visual content, querying visual databases, content-based interactive browsing and navigation, system architecture, similarity models, indexing visual databases, data models and knowledge structures, image retrieval by similarity, and video retrieval by content. *(Even years, Fall) (Evenings)*

ITCS 6158. Natural Language Processing. (3) Prerequisite: ITCS 6150. Principles, methodologies, and programming methods of natural language processing including foundations of natural language understanding, namely: lexical, syntactic, and semantic analysis, discourse integration, and pragmatic and morphological analysis. *(On demand)*

ITCS 6159. Intelligent Tutoring Systems. (3) Prerequisite: Graduate standing or permission of the instructor. This course introduces the issues relevant to

creating adaptive learning systems using artificial intelligence and includes a project to build a small Intelligent Tutoring System (ITS). Topics include: representation of knowledge and cognition, ITS design, adaptive user interfaces, design and evaluation of feedback, experimental methods, educational data mining, history of intelligent tutoring, tutor authoring, and issues for implementation. *(Fall, Odd years) (Evenings)*

ITCS 6160. Database Systems. (3) Prerequisite: ITCS 6114 or permission of department. Introduction to principles of database design, and survey of alternative database organizations and structures. Logical database organization; schemas; subschemas; data description languages; hierarchical, network, and relational databases; database management systems; normal forms. *(Fall, Spring) (Evenings)*

ITCS 6161. Advanced Topics in Database Systems (3) Prerequisite: ITCS 6160 or equivalent. Continuation of ITCS 6160. Topics include deductive databases; semantic query processing; intelligent and cooperative query languages; distributed databases; active databases; heterogeneous databases, multimedia databases; data and knowledge interchange; multidatabase systems; very large databases. *(Odd years, Fall) (Evenings)*

ITCS 6162. Knowledge Discovery in Databases. (3) Prerequisite: ITCS 6160 or permission of department. The entire knowledge discovery process is covered in this course. Topics include: setting up a problem, data preprocessing and warehousing, data mining in search for knowledge, knowledge evaluation, visualization and application in decision making. A broad range of systems, such as OLAP, LERS, DatalogicR+, C4.5, AQ15, Forty-Niner, CN2, QRAS, and discretization algorithms are covered. *(Fall) (Evenings)*

ITCS 6163. Data Warehousing. (3) Prerequisite: ITCS 6160 or equivalent. Topics include: use of data in discovery of knowledge and decision making; the limitations of relational databases and SQL queries; the warehouse data models: multidimensional, star, snowflake; architecture of a data warehouse and the process of warehouse construction; data consolidation from various sources; optimization; techniques for data transformation and knowledge extraction; relations with enterprise modeling. *(Spring) (Evenings)*

ITCS 6164. Design and Implementation of Online Management Information Systems. (3) Prerequisites: ITCS 6114 or permission of department. The fundamental concepts and philosophy of planning and implementing an online computer system. Characteristics of online systems; hardware requirements; modeling of online systems; performance measurement; language choice for online systems; organization techniques, security requirements; resource allocation. *(On demand)*

ITCS 6165. Coding and Information Theory. (3) Prerequisite: knowledge of probability theory. Information theory; coding theory; Shannon's theorem; Markov process; channel capacity; data transmission codes; error correcting codes; data compression; data encryption. *(Even years, Spring) (Evenings)*

ITCS 6166. Computer Communications and Networks. (3) Introduction to the concepts of communication networks; types of networks; wired and wireless media; communication architectures; network protocols; coding and modulation; multiplexing and multiple access; error and flow control; routing; Internet protocols; transport protocols; assignments include implementation and analysis of network protocols *(Fall) (Evenings)*.

ITCS 6167. Advanced Networking Protocols. (3) Prerequisites: ITCS 6166 or ITCS 6168. This course focuses on advanced networking concepts and protocols related to the design, implementation, integration, and management of networking and communication systems. Topics include: topology control protocols, ad hoc routing protocols, power management protocols, distributed data processing protocols for various networking systems (Internet, wireless mesh networks, ad hoc networks, sensor networks, peer-to-peer networks). *(Spring) (Evenings)*

ITCS 6168. Wireless Communication Networks. (3) Prerequisites: Graduate standing in CS, SIS, ECE or Optics and a prior course in networking. The course provides an overview of mobile systems and wireless networking technologies. Emphasis will be on resource management, routing and quality of service at the MAC and networking layers for mobile systems. Students will undertake a semester long research project to survey the research literature and identify specific challenges for cellular telecommunications, wireless LANS, ad hoc networks, mesh networks or sensor networks. *(Fall, Odd years)*

ITCS 6170. Logic for Artificial Intelligence. (3) Prerequisite: ITCS 6150 or permission of department. Introduction to basic concepts of logic for artificial intelligence, including declarative knowledge, inference, resolution, non-monotonic reasoning, induction, reasoning with uncertain beliefs, distributed information systems, intelligent information systems, planning and intelligent-agent architecture. *(On demand)*

ITCS 6171. Logic Programming. (3) Prerequisite: ITCS 6150 or permission of department. Prolog programming language; programming techniques in Prolog; foundations of logic programming including computability of Horn clause logic, completeness of resolution principle, complexity of unification algorithms, and verification of logic programs; principles of implementing logic programming systems; selected topics from applications of logic programming to expert systems, intelligent database systems, and/or natural language processing. *(On demand)*

ITCS 6175. Computability and Complexity. (3)

Prerequisite: permission of department. Study of computability, unsolvability, computational complexity. Concept of effective computability; recursive functions; mathematical models of computation; universal Turing machines; unsolvable problems; time and space complexity of computations; NP-completeness problems; sub-recursive hierarchies. *(On demand)*

ITCS 6181. Switching and Automata Theory. (3)

Prerequisite: permission of department. Topics include sets, relations, lattices, Boolean algebras; functional decomposition and symmetric functions; threshold logic; multiple-valued logic; fault detection and fault tolerant design; finite state machines, incompletely specified machines, minimization; state identification and fault detection experiments; finite state recognizers. *(On demand)*

ITCS 6182. Advanced Computer Architecture. (3)

Prerequisite: ITCS 5141 or Computer Science Graduate Standing or permission of the Department. Survey of existing and proposed architectures; pipelined, dataflow, and interconnection network architectures. Impact of VLSI on architecture. *(Fall, Alternate years) (Evenings)*

ITCS 6183. Computer Arithmetic. (3) Prerequisite: permission of department. Principles, architecture, and design of fast two operand adders; multioperand adders, standard multipliers, and dividers. Cellular array multipliers and dividers. Floating point processes, BCD, and excess three adders, multipliers, and dividers. *(On demand)*

ITCS 6184. Fault Tolerant Digital Systems. (3)

Prerequisite: ITCS 5141. Design and analysis of fault tolerant digital systems including design techniques, qualitative and quantitative methods of evaluation, and available fault tolerant digital systems. *(On demand)*

ITCS 6186. Application Specifics System Design and Simulation. (3) Prerequisite: ITCS 5141 or equivalent or permission of department. Project oriented course on techniques and methodology in design and development of special purpose systems valuable for business, healthcare, and industrial community; course content includes system specifications, interface structure and data communication, interconnection architecture, and techniques for testing and debugging. *(On demand)*

ITCS 6220. Pattern Recognition. (3) Prerequisite:

Graduate standing. Topics include: pattern pre-processing and feature extraction (entropy minimization, orthogonal expansion, Fourier expansion, Karhunen-Loeve expansion, PCA); linear decision functions; orthogonal and non-orthogonal systems of functions; pattern classification by distance functions (Nearest Neighbor, K-means, ISODATA); pattern classification by likelihood functions (Bayesian classifiers, estimation of probability density function); trainable classifiers (LMSE, Perceptron, multi-layer perceptrons, fuzzy classifiers); stochastic processes;

classification on categorical attributes. *(On demand)*

ITCS 6222. Biomedical Signal Processing. (3)

Prerequisites: Graduate standing. Topics include: fundamental techniques in processing, analysis, feature extraction, and classification of complex signals; origin and processing techniques for biomedical signals, including ECG, ENG, EEG, MEG, ERG, EMG, respiratory signals, blood sound, and pressure signals. *(On demand)*

ITCS 6224. Biomedical Image Processing. (3)

Prerequisites: Graduate standing, and MATH 2164 or its equivalent. Topics include: review of image processing and pattern recognition (2-D Fourier transforms, 2-D Wavelet transform, denoising of medical images); origin and processing of X-ray images; CT images; MRI images; ultrasonic images; PET images; thermal images; electrical impedance images; cross-registration between images of different source; stereotactic neurosurgery; stereotactic radiosurgery/radiotherapy; robot-assisted surgery. *(On demand) (Evenings)*

ITCS 6226. Bioinformatics. (3) Prerequisite: Graduate standing. Topics include: brief review of molecular biology, proteins, and their classifications, DNA, RNA, and using microarrays and gene chips for sequencing; review of computational techniques for bioinformatics, expectation maximization, Bayesian classifiers, dynamic programming, information theory and entropy analysis, Markov chain models, and neural networks; computational techniques for local and multiple sequence alignment; application of Markov chains in finding genes; using information theory to estimate binding sites, start Codon prediction; RNA secondary structure prediction; computational techniques for protein function prediction; advanced signal processing techniques in feature extraction from protein sequences. *(On demand) (Evenings)*

ITCS 6228. Medical Informatics (3) Prerequisite: Graduate standing. This course focuses on methods and techniques used in storage, communication, processing, analysis, integration, management, and distribution of medical information. The course emphasizes the applications of telemedicine and intelligent computer-aided decision making systems in different medical and surgical systems. The course also discusses the computational methods to accept or reject a new drug or a new treatment for a given disease. *(Fall, Odd years) (Evenings)*

ITCS 6265. Advanced Topics in Knowledge Discovery in Databases. (3) Continuation and extension of ITCS 6162. Information visualization in data mining and knowledge discovery, predictive data mining, mining of multimedia sources, mining of unstructured data, distributed data mining, mining of Web data/information, mining complex types of data, mining of biotechnology data, applications, and trends in data mining. *(On demand)*

ITCS 6267. Intelligent Information Retrieval. (3)

Prerequisite: ITCS 6114 or permission of department. Topics include: definition of the information retrieval problem, modeling the information retrieval problem, evaluation of information retrieval, query languages and operations, text processing, indexing and searching, parallel and distributed information retrieval, user interface and visualization, multimedia information retrieval, and information retrieval applications. (*Even years, Spring Evenings*)

ITCS 6490. Industrial Internship. (0-6) Prerequisite: Completion of six hours of graduate coursework. Full or part-time academic year internship in computer science areas complementary to the concentration area of studies and designed to allow theoretical and course-based practical learning to be applied in a supervised industrial experience. Each student's internship program must be approved by the supervising faculty, the academic advisor, and the graduate program director. A mid-term report and a final report to be evaluated by the supervising faculty are required. Grading will be on "Pass/No Credit" basis by the supervising faculty in consultation with off-campus supervisor at the internship organization. The credit hours may not be part of the minimum 30 credit hours for graduation. May be repeated for credit hours. (*On demand*)

ITCS 6500. Complex Adaptive Systems. (3) Cross-listed as ITCS 8500 and ITIS 6500/8500. Prerequisite: Permission of instructor. Complex adaptive systems (CAS) are networked (agents/part interact with their neighbors and, occasionally, distant agents), nonlinear (the whole is greater than the sum of its parts), adaptive (the system learns to change with its environment), open (new resources are being introduced into the environment), dynamic (the change is a norm), emergent (new, unplanned features of the system get introduced through the interaction of its parts/agents), and self-organizing (the parts organize themselves into a hierarchy of subsystems of various complexity). Ant colonies, networks of neurons, the immune system, the Internet, social institutions, organization of cities, and the global economy are a few examples where the behavior of the whole is much more complex than the behavior of the parts. This course will cover those and similar topics in an interactive manner. Examples of our current research effort will be provided. Topics include: Self-organization; emergent properties; learning; agents; localization affect; adaptive systems; nonlinear behavior; chaos; complexity. (*On demand*)

ITCS 6690. Computer Science Seminar. (3) Prerequisites: at least 18 graduate ITCS/ITIS hours and permission of department. Experience for the advanced M.S. student on current problems of computer design and application. (May be used by a student or small group of students to work with a professor on a topic of mutual interest. May be used to give a course on a topic announced in advance.) (*On demand*)

ITCS 6880. Individual Study. (1-3) Prerequisites: At least

18 graduate ITCS/ITIS hours and permission of department. With the direction of a faculty member, students plan and implement appropriate objectives and learning activities to develop specific areas of expertise through research, reading, and individual projects. May be repeated for credit. (*On demand*)

ITCS 6991. Information Technology Thesis. (1-3) Prerequisite: permission of department. Graduate thesis research. Detailed exploration of an area of computer science chosen for thesis research. May be repeated for credit but no more than six hours may be applied to M.S. degree requirements. (*Fall, Spring, Summer*)

ITCS 7999. Master's Degree Graduate Residency Credit. (1) See Department for Course Description. (*Fall, Spring, Summer*)

Information Technology

- **Ph.D. in Information Technology**
- **M.S. in Information Technology**
- **Graduate Certificate in Information Security and Privacy**
- **Graduate Certificate in Management of Information Technology**

College of Computing and Informatics

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 Jamie Payton, Assistant Professor
 Anita Raja, Assistant Professor
 Zbigniew Ras, Professor
 William Ribarsky, BoA Endowed Professor
 Stephanie Robbins, Professor
 Cem Saydam, Professor
 Mohamed Shehab, Assistant Professor
 Min Shin, Associate Professor
 Richard Souvenir, Assistant Professor
 Antonis Stylianou, Professor
 Zhengchang Su, Assistant Professor
 Chandrasekar Subramaniam, Assistant Professor
 Kalpathi Subramanian, Associate Professor
 William J. Tolone, Associate Professor
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 Yongge Wang, Associate Professor
 Yu Wang, Assistant Professor
 Zachary Wartell, Assistant Professor
 Jennifer Weller, Associate Professor
 A. Barry Wilkinson, Professor
 David Wilson, Assistant Professor
 Dale-Marie Wilson, Assistant Professor
 Wensheng Wu, Assistant Professor
 Xintao Wu, Associate Professor
 Wei-Ning Xiang, Professor
 Jing Xiao, Professor
 Jing Yang, Assistant Professor
 Michael Youngblood, Assistant Professor
 Kexin Zhao, Assistant Professor
 Yuliang Zheng, Professor
 Jing Zhou, Assistant Professor

Adjuncts

Ilieva Ageenko, Assistant Professor
 Bruce Anderson, Assistant Professor
 Gail-Joon Ahn, Associate Professor
 Agnieszka Dardzinska, Assistant Professor

Jay Dominick, Associate Professor
 Krzysztof Marasek, Associate Professor
 Larry Hodges, Professor
 Paul Jastreboff, Professor
 Shusaku Tsumoto, Professor
 Alicja Wieczorkowska, Assistant Professor

PH.D. IN INFORMATION TECHNOLOGY

Program of Study

The Ph.D. in Information Technology program has five options: Bioinformatics (BI), Business Information Systems and Operations Management (BISOM), Computer Science (CS), Software and Information Systems (SIS), and an Interdisciplinary Track (INT). The Program is staffed with a multidisciplinary faculty and offers opportunities for students to develop advanced competencies in a number of IT related fields. Faculty from the Departments of Computer Science, Software & Information Systems, and Business Information Systems & Operations Management form its core. Students, in cooperation with faculty advisors, design flexible programs of study tailored to address individual career goals

Students who aspire to academic research and teaching can benefit from a strong research faculty of international stature and exposure to practical applications of their specialties. Others seeking employment in industry, commerce, or government are afforded the opportunity to participate in high-quality applied research.

General Admission Requirements

Admission is competitive. Preference is given to applicants with strong credentials and appropriate undergraduate and/or professional preparation. Specific admission requirements for the program include:

- 1) A baccalaureate degree from a recognized institution. Students must show evidence of preparation in their chosen field sufficient to ensure profitable graduate study.
- 2) A satisfactory past academic performance as usually reflected by a grade point average of (or equivalent to) at least 3.0 (on a 4.0 scale) on courses related to the chosen field of Ph.D. study.
- 3) Excellent GRE or GMAT scores.
- 4) Applicants whose native language is not English must score at least 557 in the paper-based version of the Test of English as a Foreign Language (TOEFL). In addition, they will be required to take an English Proficiency Examination prior to the beginning of the first semester of study. Students who do not pass this examination must pass ENGL 1100 (English as a Foreign Language) with a grade of B or higher.
- 5) A one-page essay that addresses the following:

- a. The applicant's motivation
 - b. Area(s) of research interest
- 6) Three letters of reference from professionals working in the applicant's field of interest that address the applicant's previous experience and potential to do research.

Further documentation that will support the application may include: evidence of scholarly and creative activity, including publication list; awards; results in national or international contests related to information technology and the like.

Highly qualified individuals who may not meet all the required prerequisites may be admitted with a clear agreement to make up the prerequisites.

Track Specific Additional Admission Requirements

Additional admission requirements for Business Information Systems and Operations Management, Computer Science, & Software and Information Systems tracks include:

- 1) Adequate understanding of software/information systems analysis, design, and implementation
- 2) Evidence of college-level skills in mathematical logic and data analysis (e.g., statistics, differential and integral calculus, discrete math, linear algebra)

Admission requirements for the Bioinformatics track will include an adequate preparation in chemistry, biology, mathematics (preferably statistics), and computer science. Strong candidates may be allowed to make up deficiencies in some areas at the discretion of the BI admissions subcommittee.

Application Deadlines

Application deadlines are in accordance with UNC Charlotte Graduate School deadlines. However, to ensure full consideration for financial support, applications must be received by September 1st for Spring admission and February 15th for Fall admission.

Degree Requirements

The Ph.D. Program in Information Technology prepares students to be well-rounded professionals in the broad discipline of Information Technology. The degree of Doctor of Philosophy is granted for performance of original research resulting in significant contributions to the discipline's body of knowledge. Students are admitted into a track within the Program by one of the participating units. Currently, these units are:

- 1) Department of Business Information Systems and Operations Management
- 2) Department of Computer Science
- 3) Department of Software and Information Systems

- 4) Department of Bioinformatics and Genomics

The Ph.D. IT program also has an interdisciplinary track in which IT is applied to different disciplines. Students in the interdisciplinary track are admitted into one unit but are expected to complete some course work in a complementary discipline in addition to the minimum core requirements of their chosen unit. Students in the interdisciplinary track must have co-advisors from their chosen unit and the complementary discipline.

Minimum Hours

To earn a Ph.D. degree, students in all tracks must complete at least 72 post baccalaureate credit hours. This includes at least 18 hours of dissertation research and at least 9 hours of course work completed at UNC Charlotte. A limited amount of transfer credit is allowed (see below for details). We expect students to acquire a sufficiently broad body of technical knowledge in the discipline as well as a deep understanding of a specialized area. Such courses will be defined by the student's advisor(s). Students are expected to excel in all course work. Graduation requirements mandate that students must achieve a minimum grade point average of 3.0 to graduate. Receiving more than two C grades or a grade of U in any course will result in a suspension from the program.

Introduction to Information Technology Research

First year students must take ITSC 8110 Introduction to Information Technology at the first Fall semester. This course will be jointly taught by IT Ph.D. Faculty in all the tracks, providing new students an overview of the IT research areas and opportunities at UNC Charlotte.

Only when there is an unavoidable schedule conflict between ITSC 8110 and another Ph.D. level course that a student has to take, the student can make a request to take ITSC 8110 in the second Fall semester. Such a request must be justified and signed by the student's initial Ph.D. advisor and endorsed by the Ph.D. Program Director.

Graduate Research Seminar

Students must sign up for and received credit for the Graduate Research Seminar (ITSC 8699) every semester that they are in the Ph.D. Program until they are admitted to Ph.D. candidacy.

If there is a legitimate reason that a student has to do part of his/her Ph.D. research in a different site during a regular semester, then he/she must first make a request to be exempted from taking ITSC 8699 for the period that he/she is visiting the other site. Such a request must be well justified and signed by the student's Ph.D. advisor and endorsed by the Ph.D. Program Director. The period of exemption should not exceed one semester. Exceptions have to be approved by the Ph.D. Steering Committee.

Research Advisor(s) and Qualifying Exam Committee

Each Ph.D. student is assigned a temporary academic advisor(s) within a track when admitted to the Program. Before the end of their fourth semester in the Program students should select a Research Advisor(s) and, in consultation with their Research Advisor(s), form a Qualifying Exam Committee. The Qualifying Exam Committee should include at least three IT Doctoral Faculty members, including the Research Advisor(s) who chairs the Committee. The Qualifying Exam Committee should be approved by the Program Director.

Qualifying Examination

Each student must select a primary area of focus within the chosen track and then pass a qualifying exam in that area, given and evaluated by the student's Qualifying Exam Committee. The purpose of the qualifying exam is to allow the student to demonstrate that they are capable of doing Ph.D. level research leading to a dissertation.

The Qualifying Examination consists of two mandatory components: an original written research contribution component and a written examination component on the student's primary area of focus. The student must file Qualifying Examination Application at least one month before the written examination takes place. Copies of the original written research contribution must be submitted at the time of filing the Qualifying Examination Application. The Qualifying Examination Committee will evaluate the research contribution in writing and grade it on pass/fail basis. At the discretion of the Committee, a student may be requested to give an oral presentation of his research contribution. The Committee will decide the length of the written examination and whether an oral component of the examination should be included. The passing grade is 75.

The student must pass both the written research contribution and the exam components of the qualifying exam before the end of their first six semesters of Ph.D. study at UNC Charlotte. Exceptional performance on one component cannot be substituted for a failure on the other component. If either component is failed, then only that component needs to be re-taken. A second failure of a given component will result in the termination of the student's enrollment in the Ph.D. program.

Dissertation Committee

After passing the qualifying exam, set up a Dissertation Committee of at least four graduate faculty members, which include at least three IT PhD faculty members. This Committee may, but is not required to consist of the same faculty members as the Qualifying Exam Committee. Ordinarily, the chair of this committee will be the student's advisor(s), who will insure that the composition of the committee is appropriate. The Dissertation Committee must be approved by the Program Director. In addition, the Graduate School will appoint a Graduate Faculty

Representative to the Dissertation Committee.

Proposal Defense

Each student must present and defend a Ph.D. dissertation proposal no more than three semesters after passing the qualifying exam. The proposal defense will be conducted by the student's Dissertation Committee and will be open to the Ph.D. IT faculty and students. At the discretion of the Dissertation Committee, the defense may include questions that cover the student's program of study and background knowledge in the area of the proposal. A doctoral student advances to Ph.D. candidacy after the dissertation proposal has been successfully defended. The second failed defense of a dissertation proposal will result in termination of the student's enrollment in the Ph.D. program.

Ph.D. Candidacy

A doctoral student advances to Ph.D. candidacy after the dissertation proposal has been successfully defended.

Dissertation

Each student must complete a research program approved by the student's Dissertation Advisor(s) that yields a high quality, original and substantial piece of research. The Ph.D. dissertation describes this research and its results. The dissertation defense is a public presentation. A written copy of the dissertation must be made available to each member of the student Ph.D. Dissertation Committee, to the Ph.D. Steering Committee, and to the UNC Charlotte Library at least three weeks before the public defense. The date of the defense must be publicly announced at least three weeks prior to the defense. The student must present the dissertation and defend it in a manner accepted by the Dissertation Committee. The dissertation will be graded as pass/fail by the Dissertation Committee and must be approved by the Dean of the Graduate School. A student who fails the defense of a dissertation twice will be terminated from the Ph.D. program.

Progress Report and Evaluation

Every January, each student is required to submit a written progress report for the previous calendar year and the advisor(s) is required to submit a written evaluation of the student, both to the track leader with a copy to the Program Director. Failure to make satisfactory progress may result in discontinuation of the student's graduate assistantship and suspension from the program.

Residency Requirements

Each student must satisfy the residency requirement of one continuous full-time year (i.e., two consecutive semesters with the student being enrolled for at least nine graduate credit hours in each semester) after being admitted to the Ph.D. degree program.

Transfer Credit

In accordance with rules of the UNC Charlotte Graduate

School, students are allowed to transfer up to 30 semester hours of graduate credit earned at UNC Charlotte or other recognized graduate programs. In cases of applicants with records of exceptionally high quality, the IT Ph.D. Steering Committee, at its discretion, may request that the Graduate School approve transfer credit beyond the limit set by the Graduate School. To receive transfer credit, students must file a written request and submit all necessary documents to the Program Director.

Track Specific Additional Degree Requirements

Bioinformatics Track

Students will be required to demonstrate competence, by coursework, examinations, or projects, in the areas of biochemistry, cellular and molecular biology, genetics, statistics, and computer science related to core concepts in bioinformatics. The student's advisor and at least one other dissertation committee member must be faculty in the Bioinformatics track. Students in this track must also take at least 6 hours of Pre-dissertation Research (ITSC 8990) under the direction of Bioinformatics track faculty members. A major goal of this course will be to prepare the student for the Qualifying Examination. All students within the Bioinformatics track must serve as a teaching associate for at least one course.

Business Information Systems and Operations Management Track

In addition to the general IT Ph.D. requirements, students must also:

- 1) Take at least 36 hours of coursework approved by the student's Research Advisor(s). At least 9 hours of graduate coursework must be taken at UNC Charlotte (Exceptions to minimum course hour requirements may be granted by the Department's Graduate Affairs Committee upon the recommendation of the student's advisor. Such a request should only be granted based on overwhelming evidence that the student has excellent background knowledge to conduct high quality research in Information Technology.)
- 2) Complete at least 18 hours of dissertation research.

Computer Science Track

In addition to the general IT Ph.D. requirements, students must also:

- 1) Take at least 6 hours of Pre-dissertation Research (ITSC 8990) during the students' first four semesters under the direction of one or more IT Ph.D. Graduate Faculty members.
- 2) Take at least 30 hours of coursework approved by the student's Research Advisor(s). At least 9 hours of graduate coursework must be taken at UNC Charlotte (Exceptions to minimum course hour requirements may be granted by the Department Graduate Committee upon the recommendation of the student's Dissertation Committee. Such a request should only be granted based on overwhelming

evidence that the student has excellent background knowledge to conduct high quality research in Information Technology.)

- 3) Complete at least 18 hours of dissertation research.

Interdisciplinary Track

The course work requirements of this track depend on the chosen unit and complementary discipline. Students are required to complete the core requirements of the chosen unit and select a minimum of two graduate courses from a complementary discipline with the approval of their Advisors.

Software and Information Systems Track

In addition to the general IT Ph.D. requirements, student must also:

- 1) Take at least 6 hours of Pre-dissertation Research (ITSC 8990) during the students' first four semesters under the direction of one or more IT Ph.D. Graduate Faculty members.
- 2) Take at least 30 hours of coursework approved by the student's Research Advisor(s). At least 9 hours of graduate coursework must be taken at UNC Charlotte (Exceptions to minimum course hour requirements may be granted by the Department Graduate Committee upon the recommendation of the student's Dissertation Committee. Such a request should only be granted based on overwhelming evidence that the student has excellent background knowledge to conduct high quality research in Information Technology.)
- 3) Complete at least 18 hours of dissertation research

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

The objective of the information technology program leading to the Master of Science degree is to provide advanced skills and knowledge in the planning, design, implementation, testing, and management of applications of computing and communication technologies for business, industry, government, and other organizations.

The primary areas of interest are: information security and privacy, information and infrastructure assurance, information integration, software engineering, intelligent information environments, pervasive computing applications, human-computer interaction, and knowledge discovery and management.

Additional Admission Requirements

- 1) The program requires applicants to have completed undergraduate course work, or equivalent, in an object-oriented programming language (e.g., C++, C#, or Java) and in data structures with a minimum grade point average of 3.0 on a 4.0 scale.

- 2) The program requires applicants to have an undergraduate grade point average of at least 2.8 (on a 4.0 point scale) and a junior/senior GPA of at least 3.0.
- 3) The program requires a satisfactory score on the Graduate Record Examination or Graduate Management Admission Test.

Degree Requirements

A total of 30 graduate credit hours are required. No more than 12 hours of non-ITIS coursework can be applied to this degree. The following requirements are effective for all degree students.

Core Requirements

Each student must complete six core program requirements – eighteen (18) credit hours. These requirements may be satisfied by the following coursework.

- ITIS 5160 Applied Databases (*ITCS 6160 can be substituted for ITIS 5160*)
- ITIS 5166 Network-Based Application Development
- ITIS 6112 Software System Design and Implementation
- ITIS 6177 System Integration
- ITIS 6200 Principles of Information Security and Privacy
- ITIS 6342 Information Technology Project Management

Concentration Requirements

Each student must also complete an approved concentration area – nine (9) credit hours. Details on concentration requirements are available on the department website and at the department office. Current concentration areas include:

- 1) Advanced Data and Knowledge Discovery
- 2) Human-Computer Interaction
- 3) Information Security and Privacy
- 4) Information Technology Management
- 5) Software Systems Design and Engineering
- 6) Thesis Option

Other concentration areas are possible with the approval of the MSIT Program Coordinator. In addition, the MSIT Program Coordinator can approve substitution of courses within approved concentration areas.

Students satisfy remaining program requirements by completing approved IT elective coursework.

Master's Thesis Option

Students may elect to complete a master thesis. When a student elects this option, the student's thesis topic becomes the student's approved concentration (six credit hours of thesis research and three credit hours of approved related coursework).

Assistantships

Financial assistance for qualified students is available on a competitive basis in the form of graduate teaching and research assistantships. The deadline for graduate teaching assistantship applications is March 31 for the following academic year.

Practica

Students can elect to participate in a practica (ITIS 6198).

CERTIFICATE IN INFORMATION SECURITY AND PRIVACY

The purpose of the Certificate in Information Security and Privacy is to meet the needs of persons who are interested in pursuing a career in this important area of Information Technology. The proposed certificate program may also serve the education needs of IT-related professionals seeking more advanced knowledge of this fast growing field. The certificate requires 12 hours of coursework. The certificate may be pursued concurrently with a related graduate degree program at UNC-Charlotte.

Additional Admission Requirements

For admission into the certificate program, applicants must meet the following requirements:

- 1) Applicant should hold a Bachelor's degree in a computer science, IT, mathematics, scientific, engineering, or business discipline.
- 2) Applicant must demonstrated knowledge of a modern object-oriented programming language such as C++, C#, or Java, and a background in data structures.
- 3) Applicants must either be enrolled and in good standing in a graduate degree program at UNC Charlotte, or have an undergraduate overall GPA above 2.8 (on a 4.0 scale) and a junior/senior GPA above 3.0.

Applicants are required to submit a brief (one-to-two page) statement of educational and work experiences. Application for this certificate program is made through the Office of Graduate Admissions. (**Note: the admission process for the Certificate is separate from the admission process for the MS degree.**)

Certificate Requirements

- 1) **Take the following core course:**
ITIS 6200 Principles of Info Security and Privacy (3)
- 2) **Take three courses from the following elective courses*:**
ITIS 5220 Vulnerability Assessment and System Assurance (3)
ITIS 5250 Computer Forensics (3)
ITIS 6210 Access Control and Security Architecture (3)
ITIS 6230 Information Infrastructure Protection (3)
ITIS 6240 Applied Cryptography (3)
ITIS 6362 Information Technology: Ethics, Policy, and

Security (3)
 ITIS 6167 Network Security (3)
 ITIS 6140 Software Testing and Quality Assurance (3)
 ITIS 6150 Software Assurance (3)
 ITIS 6198 IT Internship Project (3)
And one of:
 ITIS 5166 Network-Based Application Development (3)
 ITCS 6166 Computer Communication Networks (3)

**Other course options may be available, please contact the program coordinator.*

All requirements must be completed within four years from enrollment in the first certificate course. **Courses taken in one certificate program may not be counted toward a second certificate.**

CERTIFICATE IN MANAGEMENT OF INFORMATION TECHNOLOGY

The Certificate in Management of Information Technology meets the demand for a growing number of individuals who are working in an IT related discipline and are interested in acquiring some formal IT training for career or educational purposes. The Certificate requires 15 hours of coursework. Some of the courses (indicated by asterisks) require substantial programming prerequisites.

Additional Admission Requirements

For admission, applicants must hold a Bachelor's degree from an accredited institution and meet the admission requirements of the UNC Charlotte Graduate School. Applicants must have an undergraduate overall GPA above 2.8 (on a 4.0 scale) and a junior/senior GPA above 3.0. Applicants must also have working knowledge of applications of Information Technology. **(Note: the admission process for the Certificate is separate from the admission process for the MS degree.)**

Certificate Requirements

Both of the following courses are required:

ITIS 6342 Information Technology Project Mgmt (3)
 ITIS 6362 Information Technology: Ethics, Policy, and Security (3)

Three electives from the following list are required:

ITIS 6200 Principles of Info Security and Privacy (3)
 ITIS 6230 Information Infrastructure Protection (3)
 ITIS 6112 Software System Design & Implementation (3)**
 ITIS 5160 Applied Databases (3)**
 ITIS 5166 Network Based App Development (3)**
 GEOG 6615 Advanced Seminar in Spatial Decision Support Systems (4)
 MBAD 5121 Business Information Systems (3)
 MBAD 6122 Tech-Enhanced Decision Making (3)

MBAD 6160 Information Systems in Public Administration (3)
 MBAD 6202 Business Info Systems Development (3)

***Requires knowledge of object-oriented programming language (e.g., C++, C#, or Java), and data structures.*

All requirements must be completed within four years from enrollment in the first certificate course. **Courses taken in one certificate program may not be counted toward a second certificate.**

COURSES IN INFORMATION TECHNOLOGY – DOCTORAL

Bioinformatics (BINF)

BINF 6100. Biological Basis of Bioinformatics. (3)

Prerequisites: Admission to graduate standing in Bioinformatics and undergraduate training in Computer Science or other non-biological discipline. Provides a foundation in molecular genetics and cell biology focusing on foundation topics for graduate training in bioinformatics and genomics. *(Fall)*

BINF 6101. Energy and Information in Biological Modeling. (3)

Prerequisite: Admission to graduate standing in Bioinformatics. This course covers: the major organic and inorganic chemical features of biological macromolecules, the physical forces that shape biological molecules, assemblies and cells, the chemical driving forces that govern living systems, the molecular roles of biological macromolecules and common metabolites, and the pathways of energy generation and storage. Each section of the course builds upon the relevant biology and chemistry to explain the most common mathematical and physical abstractions used in modeling in the relevant context. *(Spring)*

BINF 6111. Bioinformatics Programming I. (3)

Prerequisite: Admission to graduate standing in Bioinformatics. Students in this course will learn how to use object-oriented programming to solve common problems in bioinformatics. Topics covered will include creation and manipulation of relational databases and interfacing with standard bioinformatics programs such as CLUSTAL, BLAST and HMMer. Emphasis will be placed on the creation of memory and time efficient algorithms to handle the large data sets of post-genomic biology. *(Fall)*

BINF 6112. Bioinformatics Programming II. (3)

Prerequisite: BINF 6111. This is a continuation of Bioinformatics Programming I (BINF 6111). While the previous course emphasized fundamentals of Bioinformatics programming, this course emphasizes efficiency in speed, data structures and file size. Students will learn how to optimize code and databases so that the demanding analyses

of modern biology can be performed in acceptable amounts of time while minimizing hardware requirements. Topics covered will include algorithm optimization, optimization of database queries and parallel processing to allow bioinformatics calculations to be performed on clusters. *(Spring)*

BINF 6200. Statistics for Bioinformatics. (3)

Prerequisites: BINF 6100 and 6111 or equivalents. The aim of this 3-credit course is to introduce students to statistical methods used in further more technical courses. Basic relevant concepts from probability, stochastic processes, information theory, statistics and experimental design will be introduced and illustrated by examples from molecular biology, genomics and population genetics with an outline of algorithms and software. R is introduced as the programming language for homework. *(Fall)*

BINF 6201. Molecular Sequence Analysis. (3)

Prerequisite: BINF 6100 or equivalent. Introduction to bioinformatics methods that apply to molecular sequence. Intro to biological databases online. Sequence databases, molecular sequence data formats, sequence data preparation and database submission. Local and global sequence alignment, multiple alignment, alignment scoring and alignment algorithms for protein and nucleic acids, gene finding and feature finding in sequence, models of molecular evolution, phylogenetic analysis, comparative modeling. *(Fall)*

BINF 6202. Computational Structural Biology. (3)

Prerequisites: BINF 6101 and 6201 or equivalents. This course will cover: (a) the fundamental concepts of structural biology (chemical building blocks, structure, superstructure, folding, etc.); (b) software for visualization, visualization styles, publication quality images; (c) the hierarchical nature of biomacromolecular structure classification; (d) computational methods to evaluate and compare biomacromolecular structure; (e) inferring structure/function relationships from structure; and (f) computational prediction of protein and nucleic acid structure from sequence. *(Fall)*

BINF 6203. Genomics, Transcriptomics & Proteomics. (3)

Prerequisites: BINF 6100 or equivalent, and BINF 6201. This course surveys the application and interpretation of high-throughput molecular biology and analytical biochemistry methods used to produce the kinds of high-volume biological data most commonly encountered by bioinformaticians. The relationship between significant biological questions, modern biotechnology methods, and the bioinformatics solutions that enable interpretation of complex data is emphasized. Topics include: Genome sequencing and assembly, genome annotation, genome comparison. Genome evolution. Function prediction and gene ontologies. Microarray assay design, data acquisition, data analysis. Proteomics and methods and data analysis. Methods for identification of molecular interactions. Metabolic databases, pathways and models. *(Spring)*

BINF 6204. Mathematical Systems Biology. (3)

Prerequisites: BINF 6200 and 6210 or equivalents. Introduction to concepts and common methods in systems biology. The class emphasizes molecular networks, models and applications, and covers the following topics: complexity and robustness of cellular systems; hierarchy and modularity of molecular interaction networks; biologically data acquisition for system level modeling; introduction to systems biology markup language (SBML); Bayesian inference of biological systems; stoichiometric and constraint-based modeling; modeling molecular interaction networks with nonlinear ordinary differential equations; quantitative approaches to the analysis of genetic regulatory networks; stochastic modeling of intracellular kinetics; multilevel modeling. *(Spring)*

BINF 6210. Numerical Methods in Bioinformatics. (3)

Prerequisites: Ability to program in a high-level language (Perl, Java, C#, Python, Ruby, C/C++) and Calculus. This course will focus on mathematically complex problems and show students how to implement efficient numerical methods to solve those problems. The focus on the class will depend on instructor expertise but may include: applying linear models and principal component analysis to analysis of microarrays, application of ordinary and partial differential equations to modeling cellular pathways, applying Markov Chains to gene finding and gene predictions algorithms and application of stochastic models and Monte Carlo simulations to molecular dynamics and protein folding. *(Fall)*

BINF 6211. Design and Implementation of Bioinformatics Databases. (3)

Prerequisites: BINF 6111 and 6112 or equivalent. Students will acquire skills needed to exploit public biological databases and establish and maintain personal databases that support their own research; such skills include learning underlying data models and the basics of DBMS, and SQL. Particular topics will include formats and schemas in important bioinformatics databases (Genbank, EMBL, PDB), XML schema and XML exchange methods, using CGI for the query interface, using generic database tools to browse and manage databases (Tomcat and Padmin), relevant database applications of SOAP and CORBA, the types of models used in designing databases, and how ontologies (such as GO) affect database design and queries. *(Spring)*

BINF 6310. Analysis of Microarray Data. (3) This course focuses on recent literature concerning algorithms for analysis of microarray data. The course will start with a review of normal statistics (t-test, ANOVA, etc.) and their non-parametric, robust equivalents. It then turns to primary literature for a survey of the techniques of analyzing microarray data: background subtraction, normalization across samples, assignment of p-values, evaluation of algorithms on control data sets, clustering algorithms, self organizing maps, bootstrap estimations of significance and over-representation of gene ontology terms. Special

attention will be given to the problem of appropriate correction of significance for multiple measurements. Students should have fluency in a high-level programming language (PERL, Java, C# or equivalent) and will be expected in assignments to manipulate and analyze large public data sets. The course will utilize the R statistical package with the bioconductor extension. *(On demand)*

BINF 6311. Biophysical Modeling. (3) This course will cover: (a) overview of mechanical force fields; (b) energy minimization; (c) dynamics simulations (molecular and coarse-grained); (d) Monte-Carlo methods; (e) systematic conformational analysis (grid searches); (f) classical representations of electrostatics (Poisson-Boltzmann, Generalized Born and Colombic); (g) free energy decomposition schemes; and (h) hybrid quantum/classical (QM/MM) methods. *(On demand)*

BINF 6312. Computational Comparative Genomics. (3) Prerequisite: BINF 6210 or equivalent. Computational methods for comparative genomics analysis. The course covers the following topics: the architecture of prokaryotic and eukaryotic genomes; the evolutionary concept in genomics. databases and resources for comparative genomics; principles and methods for sequence analysis; evolution of genomes; comparative gene function annotation; evolution of the central metabolic pathways and regulatory networks; genomes and the protein universe; cis-regulatory binding site prediction; operon and regulon predictions in prokaryotes; regulatory network mapping and prediction. *(On demand)*

BINF 6313. Structure, Function, and Modeling of Nucleic Acids. (3) Prerequisites: BINF 6100 and 6101 or equivalent. The course covers the following topics: atomic structure, macromolecular structure-forming tendencies and dynamics of nucleic acids; identification of genes which code for functional nucleic acid molecules, cellular roles and metabolism of nucleic acids; 2D and 3D abstractions of nucleic acid macromolecules and methods for structural modeling and prediction; modeling of hybridization kinetics and equilibria; hybridization-based molecular biology protocols, detection methods and molecular genetic methods, and the role of modeling in designing these experiments and predicting their outcome. *(On demand)*

BINF 6400. Internship Project. (1-3) Prerequisite: Admission to graduate standing in Bioinformatics. Project chosen and completed under the guidance of an industry partner, which results in an acceptable technical report. *(Fall, Spring)*

BINF 6600. Seminar. (1) Prerequisite: Admission to graduate standing in Bioinformatics. Departmental seminar. Weekly seminars will be given by bioinformatics researchers from within the University and across the world. *(Fall, Spring)*

BINF 6601. Journal Club. (1) Prerequisites: Admission to graduate standing in Bioinformatics. Each week, a student in the class is assigned to choose and present a paper from the primary bioinformatics literature. *(Fall, Spring)*

BINF 6900. Master's Thesis. (1-3) Prerequisites: Twelve graduate credits and permission of instructor. Project chosen and completed under the guidance of a graduate faculty member, which results in an acceptable master's thesis and oral defense. *(On demand)*

Computer Science (ITCS)

ITCS 8010. Topics in Computer Science. (3) Prerequisite: permission of department. Topics in computer science selected to supplement the regular course offerings. A student may register for multiple sections of the course with different topics in the same semester or in different semesters. *(On demand)*

ITCS 8050. Topics in Intelligent Systems. (3) Prerequisite: permission of department. Topics in intelligent systems selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITCS 8080. Topics in Computer Engineering. (3) Prerequisite: permission of department Topics in computer engineering selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITCS 8107. Formal Languages and Automata. (3) Prerequisites: one semester of discrete structures or permission of department. Detailed study of abstract models for the syntax of programming languages and information processing devices. Languages and their representation; grammars; finite automata and regular sets; context-free grammars and pushdown automata; Chomsky Hierarchy; closure properties of families of languages; syntax analysis. *(On demand)*

ITCS 8110. Topics in Programming Languages and Compilers. (3) A continuation of material in ITCS 5128 with emphasis on advanced aspects of optimization, data flow analysis, and error discovery. *(On demand)*

ITCS 8111. Evolutionary Computation. (3) Prerequisite: ITCS 8114 or permission of department. General introduction to optimization problems. Optimization techniques: hill climbing, simulated annealing, evolution strategies, genetic algorithms. Evolution programming techniques. *(Even years, Spring) (Evenings)*

ITCS 8112. Software Systems Design and Implementation. (3) Prerequisite: permission of department. Introduction to the techniques involved in the planning and implementation of large software systems. Emphasis on human interface aspects of systems. Planning software projects; software design process; top-down design;

modular and structured design; management of software projects; testing of software; software documentation; choosing a language for software system. This course is cross listed with ITIS 8112. (*Fall, Spring*)(*Evenings*)

ITCS 8114. Algorithms and Data Structures. (3)
Prerequisite: full graduate standing. Introduction to techniques and structures used and useful in design of sophisticated software systems. Records; arrays; linked lists; queues; stacks; trees; graphs; storage management and garbage collection; recursive algorithms; searching and sorting; graph algorithms; time and space complexity. (*Fall, Spring*) (*Evenings*)

ITCS 8115. Advanced Topics in Algorithms and Data Structures. (3) Prerequisite: ITCS 8114 or equivalent. Continuation and extension of ITCS 6114. String matching; seminumerical algorithms; probabilistic algorithms; parallel algorithms; NP-completeness; computationally hard problems; approximation algorithms. (*On demand*)

ITCS 8120. Computer Graphics. (3) Prerequisite: full graduate standing or permission of department. Introduction to the design and implementation of interactive graphics systems. Raster and vector display systems, I/O devices; graphics primitives and their attributes; raster algorithms and clipping; 2D/3D geometric transformations; 3D viewing and projections; hierarchical and procedural models; surface representation; color and lighting models; rendering algorithms; global illumination and texture mapping. (*Fall*) (*Evenings*)

ITCS 8124. Illustrative Visualization. (3) Prerequisite: ITCS 4120 or ITCS 5120. This course focuses on advanced concepts and techniques related to the design, implementation, integration, and management of illustrative visualization and computer graphics. Topics include various advanced visualization topics: feature extraction, non-photorealistic rendering, point-based rendering, hardware-accelerated rendering, segmentation, image generation, animation, evaluation, design, and interaction. (*Spring*) (*Evenings*)

ITCS 8126. Large Scale Information Visualization.(3)
Prerequisite: ITCS 4121 or ITCS 5121. Information Visualization. Concept, theory, design principles, data processing techniques, and visual metaphors and interaction techniques for massive, multi-dimensional, multi-source, time-varying information exploration. (*Fall*) (*Evenings*)

ITCS 8127. Real-Time Rendering Engines. (3).
Prerequisite: ITCS 5120 or ITCS 6120. This course focuses on advanced concepts and techniques employed in building real-time rendering systems that support a high level of realism as well as handle large geometric models. Topics include: modern graphics hardware, programmable shaders, shadow and environment mapping, image-based modeling and rendering, large data models (simplification, level of

detail), high quality interactive rendering. (*On demand*)

ITCS 8128. 3D Display and Advanced Interfaces. (3G).
Prerequisite: ITCS 4120 or ITCS 6120. The course covers the fundamentals of 3D display hardware and software technology. Topics include: human visual spatial perception of natural and synthetic 3D images, 3D display hardware, human computer interface algorithms for effective stereoscopic display, 3D display rendering techniques. (*On demand*)

ITCS 8130. Advanced Computer Graphics. (3)
Prerequisite: ITCS 8120 or equivalent, or permission of department. Implicit and parametric representation; cubic surfaces; advanced reflection models; global illumination models - ray tracing, radiosity; shadow algorithms, texture mapping; volumetric modeling and rendering techniques; animation; advanced modeling techniques; particle systems, fractals. (*On demand*)

ITCS 8132. Modeling and Analysis of Communication Networks. (3) Prerequisite: A course in communication networks, or permission of department. The objective of this course is to develop an understanding of modeling and analysis techniques for communication systems and networks. The intent is to enable the student to understand how to comparatively analyze the cost and performance impact of network architecture and protocol design decisions. Modeling techniques for analytical analysis, simulation based analysis, and measurement based analysis will be presented. Concepts covered include validation/verification of models, workload characterization, metric selection, presentation and interpretation of results. A semester long analysis project will be undertaken. (*Fall, Even years*)

ITCS 8134. Digital Image Processing. (3) Cross-listed as ECGR 6118. Prerequisite: full graduate standing or permission of department. Image perception; image types/applications; image restoration and enhancement; edge/boundary detection; image transformation; image segmentation; statistical and syntactical pattern recognition; image information measures and compression. (*Spring, Even year*) (*Evenings*)

ITCS 8140. Data Visualization. (3) Prerequisite: full graduate standing or permission of department. Emphasis on the methodology and application of data visualization to scientific and engineering data; data types and models; visualization methods; volume visualization; scalar, vector and tensor fields; multi-variate visualization; visualization systems and model; visualization applications; visualization software and hardware; research issues and future trends. (*On demand*)

ITCS 8144. Operating Systems Design. (3) Prerequisite: ITCS 8114 or permission of department. Introduction to features of a large-scale operating system with emphasis on resource-sharing environments. Computer system

organization; resource management; multiprogramming; multi-processing; file systems; virtual machine concepts; protection and efficiency. *(On demand)*

ITCS 8148. Advanced Object-Oriented Systems. (3) Prerequisites: ITCS 8112 or equivalent. This course focuses on issues related to the design, implementation, integration, and management of large object-oriented systems. Topics include: object models, object modeling, frameworks, persistent and distributed objects, and object-oriented databases. *(On demand)*

ITCS 8150. Intelligent Systems. (3) Prerequisites: full graduate standing or permission of department. To introduce core ideas in AI. Heuristic versus algorithmic methods; problem solving; game playing and decision making; automatic theorem proving; pattern recognition; adaptive learning; projects to illustrate theoretical concepts. *(Fall) (Evenings)*

ITCS 8153. Neural Networks. (3) Prerequisites: ITCS 8114. Topics include: Basic notions and models of artificial neural nets; single layer neural classifiers; multilayer one-way neural nets; single layer feedback networks; neural models of associative memory; self organizing neural nets; translation between neural networks and knowledge bases; applications of neural networks. *(On demand)*

ITCS 8154. Heuristic Search. (3) Prerequisite: ITCS 8150. Heuristics and problem representation; heuristic-search procedures; formal properties and performance analysis of heuristic methods; game-searching strategies and heuristic programming; search with probabilities; knowledge-guided search. *(On demand)*

ITCS 8155. Knowledge-Based Systems. (3) Prerequisite: ITCS 8162 or permission of department. Knowledge systems; knowledge discovery; association rules; query languages and operational semantics; decision systems; cooperative and collaborative systems; tree structured information systems; tree structured query languages; flexible query answering; chase algorithm based on rules; local and global ontologies; action rules; optimization problems for query answering systems. *(Spring) (Evenings)*

ITCS 8156. Machine Learning. (3) Prerequisite: ITCS 8150 or permission of department. Machine learning methods and techniques including: acquisition of declarative knowledge; organization of knowledge into new, more effective representations; development of new skills through instruction and practice; and discovery of new facts and theories through observation and experimentation. *(On demand)*

ITCS 8157. Visual Databases. (3) Prerequisites: ITCS 8160 or equivalent. Topics include: Representation of visual content, querying visual databases, content-based interactive browsing and navigation, system architecture, similarity models, indexing visual databases, data models and

knowledge structures, image retrieval by similarity, and video retrieval by content. *(Even years, Fall) (Evenings)*

ITCS 8158. Natural Language Processing. (3) Prerequisite: ITCS 8150. Principles, methodologies, and programming methods of natural language processing including foundations of natural language understanding, namely: lexical, syntactic, and semantic analysis, discourse integration, and pragmatic and morphological analysis. *(On demand)*

ITCS 8159. Intelligent Tutoring Systems. (3) Prerequisite: Graduate standing or permission of the instructor. This course introduces the issues relevant to creating adaptive learning systems using artificial intelligence and includes a project to build a small Intelligent Tutoring System (ITS). Topics include: representation of knowledge and cognition, ITS design, adaptive user interfaces, design and evaluation of feedback, experimental methods, educational data mining, history of intelligent tutoring, tutor authoring, and issues for implementation. *(Fall, Odd years) (Evenings)*

ITCS 8160. Database Systems. (3) Prerequisite: ITCS 8114 or permission of department. Introduction to principles of database design, and survey of alternative database organizations and structures. Logical database organization; schemas; subschemas; data description languages; hierarchical, network, and relational databases; database management systems; normal forms. *(Fall, Spring) (Evenings)*

ITCS 8161. Advanced Topics in Database Systems. (3) Prerequisite: ITCS 8160 or equivalent. Continuation of ITCS 8160. Topics include deductive databases; semantic query processing; intelligent and cooperative query languages; distributed databases; active databases; heterogeneous databases, multimedia databases; data and knowledge interchange; multidatabase systems; very large databases. *(Odd years, Fall) (Evenings)*

ITCS 8162. Knowledge Discovery in Databases. (3) Prerequisite: ITCS 8160 or permission of department. The entire knowledge discovery process is covered in this course. Topics include: setting up a problem, data preprocessing and warehousing, data mining in search for knowledge, knowledge evaluation, visualization and application in decision making. A broad range of systems, such as OLAP, LERS, DatalogicR+, C4.5, AQ15, Forty-Niner, CN2, QRAS, and discretization algorithms are covered. *(Fall) (Evenings)*

ITCS 8163. Data Warehousing. (3) Prerequisite: ITCS 8160 or equivalent. Topics include: use of data in discovery of knowledge and decision making; the limitations of relational databases and SQL queries; the warehouse data models: multidimensional, star, snowflake; architecture of data warehouse and the process of warehouse construction; data consolidation from various sources; optimization;

techniques for data transformation and knowledge extraction; relations with enterprise modeling. (*Spring*) (*Evenings*)

ITCS 8164. Design and Implementation of Online Management Information Systems. (3) Prerequisite: ITCS 8114 or permission of department. The fundamental concepts and philosophy of planning and implementing an online computer system. Characteristics of online systems; hardware requirements; modeling of online systems; performance measurement; language choice for online systems; organization techniques, security requirements; resource allocation. (*On demand*)

ITCS 8165. Coding and Information Theory. (3) Prerequisite: knowledge of probability theory. Information theory; coding theory; Shannon's theorem; Markov process; channel capacity; data transmission codes; error correcting codes; data compression; data encryption. (*Even years, Spring*) (*Evenings*)

ITCS 8166. Computer Communications and Networks. (3) Introduction to the concepts of communication networks; Types of networks; wired and wireless media; communication architectures; network protocols; coding and modulation; multiplexing and multiple access; error and flow control; routing; Internet Protocols; transport protocols; Assignments include implementation and analysis of network protocols. (*Fall*) (*Evenings*)

ITCS 8167. Advanced Networking Protocols. (3) Prerequisite: ITCS 6166, ITCS 8166, ITCS 6168, or ITCS 8168. This course focuses on advanced networking concepts and protocols related to the design, implementation, integration, and management of networking and communication systems. Topics include: topology control protocols, ad hoc routing protocols, power management protocols, distributed data processing protocols for various networking systems (Internet, wireless mesh networks, ad hoc networks, sensor networks, peer-to-peer networks). (*Spring*) (*Evenings*)

ITCS 8168. Wireless Communication Networks. (3) Prerequisites: Graduate standing in CS, SIS, ECE or Optics and a prior course in networking. The course provides an overview of mobile systems and wireless networking technologies. Emphasis will be on resource management, routing and quality of service at the MAC and networking layers for mobile systems. Students will undertake a semester long research project to survey the research literature and identify specific challenges for cellular telecommunications, wireless LANS, ad hoc networks, mesh networks or sensor networks. (*Fall, Odd years*)

ITCS 8170. Logic for Artificial Intelligence. (3) Prerequisite: ITCS 8150 or permission of department. Introduction to basic concepts of logic for artificial intelligence, including declarative knowledge, inference, resolution, nonmonotonic reasoning, induction, reasoning

with uncertain beliefs, distributed information systems, intelligent information systems, planning and intelligent-agent architecture. (*On demand*)

ITCS 8171. Logic Programming. (3) Prerequisite: ITCS 8150 or permission of department. Prolog programming language; programming techniques in Prolog; foundations of logic programming including computability of Horn clause logic, completeness of resolution principle, complexity of unification algorithms, and verification of logic programs; principles of implementing logic programming systems; selected topics from applications of logic programming to expert systems, intelligent database systems, and/or natural language processing. (*On demand*)

ITCS 8175. Computability and Complexity. (3) Prerequisite: permission of department. Study of computability, unsolvability, computational complexity. Concept of effective computability; recursive functions; mathematical models of computation; universal Turing machines; unsolvable problems; time and space complexity of computations; NP-completeness problems; subrecursive hierarchies. (*On demand*)

ITCS 8181. Switching and Automata Theory. (3) Prerequisite: permission of department. Topics include sets, relations, lattices, Boolean algebras; functional decomposition and symmetric functions; threshold logic; multiple-valued logic; fault detection and fault tolerant design; finite state machines, incompletely specified machines, minimization; state identification and fault detection experiments; finite state recognizers. (*On demand*)

ITCS 8182. Advanced Computer Architecture. (3) Prerequisite: ITCS 5141, Computer Science Graduate Standing, or permission of the Department. Survey of existing and proposed architectures; pipelined, dataflow, and interconnection network architectures. Impact of VLSI on architecture. (*Fall, Alternate years*) (*Evenings*)

ITCS 8183. Computer Arithmetic. (3) Prerequisite: permission of department. Principles, architecture, and design of fast two operand adders; multioperand adders, standard multipliers, and dividers. Cellular array multipliers and dividers. Floating point processes, BCD, and excess three adders, multipliers, and dividers. (*On demand*)

ITCS 8186. Application Specifics System Design and Simulation. (3) Prerequisite: ITCS 5141 or equivalent, or permission of department. Project oriented course on techniques and methodology in design and development of special purpose systems valuable for business, healthcare, and industrial community; course content include system specifications, interface structure and data communication, interconnection architecture, and techniques for testing and debugging. (*On demand*)

ITCS 8220. Pattern Recognition. (3) Prerequisites: Graduate standing. Topics include: Pattern pre-processing

and feature extraction (entropy minimization, orthogonal expansion, Fourier expansion, Karhunen-Loeve expansion, PCA); linear decision functions; orthogonal and non-orthogonal systems of functions; pattern classification by distance functions (Nearest Neighbor, K-means, ISODATA); pattern classification by likelihood functions (Bayesian classifiers, estimation of probability density function); trainable classifiers (LMSE, Perceptron, multi-layer perceptrons, fuzzy classifiers); stochastic processes; classification on categorical attributes. *(On demand)*

ITCS 8222. Biomedical Signal Processing. (3)

Prerequisites: Graduate standing. Topics include: Fundamental techniques in processing, analysis, feature extraction, and classification of complex signals; origin and processing techniques for biomedical signals, including ECG, ENG, EEG, MEG, ERG, EMG, respiratory signals, blood sound, and pressure signals. *(On demand)*

ITCS 8224. Biomedical Image Processing. (3)

Prerequisites: Graduate standing, and Math 2164 or its equivalent. Topics include: Review of image processing and pattern recognition (2-D Fourier transforms, 2-D Wavelet transform, denoising of medical images); origin and processing of X-ray images; CT images; MRI images; ultrasonic images; PET images; thermal images; electrical impedance images; cross-registration between images of different source; stereotactic neurosurgery; stereotactic radiosurgery/radiotherapy; robot-assisted surgery. *(On demand) (Evenings)*

ITCS 8226. Bioinformatics. (3) Prerequisites: Graduate standing. Topics include: Brief Review of molecular biology, proteins and their classifications, DNA, RNA, and using microarrays and gene chips for sequencing; review of computational techniques for bioinformatics, expectation maximization, Bayesian classifiers, dynamic programming, information theory and entropy analysis, Markov chain models, and neural networks; computational techniques for local and multiple sequence alignment; application of Markov chains in finding genes; using information theory to estimate binding sites, start Codon prediction; RNA secondary structure prediction; computational techniques for protein function prediction; Advanced signal processing techniques in feature extraction from protein sequences. *(On demand) (Evenings)*

ITCS 8228. Medical Informatics. (3) Prerequisites: Graduate Standing. This course focuses on methods and techniques used in storage, communication, processing, analysis, integration, management, and distribution of medical information. The course emphasizes the applications of telemedicine and intelligent computer-aided decision making systems in different medical and surgical systems. The course also discusses the computational methods to accept or reject a new drug or a new treatment for a given disease. *(Fall, Odd years) (Evenings)*

ITCS 8265. Advanced Topics in Knowledge Discovery in

Databases. (3) Continuation and extension of ITCS 8162. Information visualization in data mining and knowledge discovery, predictive data mining, mining of multimedia sources, mining of unstructured data, distributed data mining, mining of Web data/information, mining complex types of data, mining of biotechnology data, applications and trends in data mining. *(On demand)*

ITCS 8267. Intelligent Information Retrieval. (3)

Prerequisites: ITCS 8114 or permission of department. Topics include: definition of the information retrieval problem, modeling the information retrieval problem, evaluation of information retrieval, query languages and operations, text processing, indexing and searching, parallel and distributed information retrieval, user interface and visualization, multimedia information retrieval, and information retrieval applications. *(Even years, Spring) (Evenings)*

ITCS 8500. Complex Adaptive Systems. (3) Cross-listed as ITCS 6500 and ITIS 6500/8500. Prerequisite:

Permission of instructor. Complex adaptive systems (CAS) are networked (agents/part interact with their neighbors and, occasionally, distant agents), nonlinear (the whole is greater than the sum of its parts), adaptive (the system learns to change with its environment), open (new resources are being introduced into the environment), dynamic (the change is a norm), emergent (new, unplanned features of the system get introduced through the interaction of its parts/agents), and self-organizing (the parts organize themselves into a hierarchy of subsystems of various complexity). Ant colonies, networks of neurons, the immune system, the Internet, social institutions, organization of cities, and the global economy are a few examples where the behavior of the whole is much more complex than the behavior of the parts. This course will cover those and similar topics in an interactive manner. Examples of our current research effort will be provided. Topics include: Self-organization; emergent properties; learning; agents; localization affect; adaptive systems; nonlinear behavior; chaos; complexity. *(On demand)*

ITCS 8690. Computer Science Seminar. (3) Prerequisites: at least 18 graduate ITCS/ITIS hours and permission of department. Experience for the advanced Ph.D. student on current problems of computer design and application. (May be used by a student or small group of students to work with a professor on a topic of mutual interest. May be used to give a course on a topic announced in advance.) *(On demand)*

Software and Information Systems (ITIS)

ITIS 8010. Topics in Software and Information Systems.

(3) Prerequisite: permission of department. Topics in software and information systems selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITIS 8112. Software System Design and Implementation.

(3) Prerequisite: permission of department. Introduction to the techniques involved in the planning and implementation of large software systems. Emphasis on human interface aspects of systems. Planning software projects; software design process; top-down design; modular and structured design; management of software projects; testing of software; software documentation; choosing a language for software system. This course is cross listed with ITCS 8112. *(Fall) (Spring) (Evenings)*

ITIS 8130. Software Requirements Engineering for Information Systems.

(3) Prerequisite: Full graduate standing, or permission of department. Introduction to requirement engineering methodologies. Topics include: requirements elicitation, specification, and validation; structural, informational, behavioral, security, privacy, and computer user interface requirements; scenario analysis; application of object-oriented methodologies in requirements gathering; spiral development models; risk management models; software engineering maturity model. *(On demand)*

ITIS 8140. Software Testing and Quality Assurance.

(3) Prerequisite: ITIS 6112 or permission of department. Methods for evaluating software for correctness, and reliability including code inspections, program proofs and testing methodologies. Formal and informal proofs of correctness. Code inspections and their role in software verification. Unit and system testing techniques, testing tools and limitations of testing. Statistical testing, reliability models. Software engineering maturity model. *(On demand)*

ITIS 8148. Advanced Object-Oriented Systems.

(3) Cross-listed as ITCS 8112. Prerequisites: ITIS 8112 or equivalent. This course focuses on issues related to the design, implementation, integration, and management of large object-oriented systems. Topics include: object models, object modeling, frameworks, persistent and distributed objects, and object-oriented databases. *(Spring)(Alternate Years)(Evenings)*

ITIS 8150. Software Assurance.

(3) Cross-listed as ITIS 6150. Prerequisite: ITIS/ITCS 6112, ITIS/ITCS 8112, ITIS 6177, ITIS 8177, or permission of the department. This course will be an introduction to software assurance education and research. Topics discussed will include the security of software across the development life cycle that addresses trustworthiness, predictable execution and conformance. Various aspects of secure software requirements, design, construction, verification, and validation, process and engineering management will be focused as they relate to secure software development. Students will gain hands-on experience in various techniques and tools as part of a semester-long project in addition to other assignments. *(On demand)*

ITIS 8156. Computer-Aided Instruction.

(3) Prerequisite: permission of department. History of CAI; study of current CAI systems; development of man-machine dialogue; programming tools for CAI; information structures for computer-oriented learning. Advantages/disadvantages/costs of CAI. *(On demand)*

ITIS 8163. Data Warehousing. (3) Prerequisite: ITCS 8160 or equivalent. Topics include: use of data in discovery of knowledge and decision making; the limitations of relational databases and SQL queries; the warehouse data models: multidimensional, star, snowflake; architecture of data warehouse and the process of warehouse construction; data consolidation from various sources; optimization; techniques for data transformation and knowledge extraction; relations with enterprise modeling. This course is cross listed as ITCS 8163. *(Odd years, Spring) (Evenings)*

ITIS 8164. Online-Info Systems. (3) Prerequisites: ITCS 6114 or permission of department. The fundamental concepts and philosophy of planning and implementing an online computer system. Characteristics of online systems; hardware requirements; modeling of online systems; performance measurement; language choice for online systems; organization techniques, security requirements; resource allocation. *(On demand)*

ITIS 8167. Network and Information Security.

(3) Prerequisite: ITCS 6166 or equivalent. This course examines the issues related network and information security. Topics include concepts, security attacks and risks, security architectures, security policy management, security mechanisms, cryptographic algorithms, security standards, security system interoperation and case studies of the current major security systems. *(Fall) (Evening)*

ITIS 8177. System Integration.

(3) Prerequisite: ITIS 5166 and ITIS 5160, or equivalents. This course examines the issues related to system integration. Topics include: data integration, business process integration, integration architecture, middleware, system security, and system management. *(Fall) (Evening)*

ITIS 8200. Principles of Information Security and Privacy.

(3) Prerequisite: permission of department. Topics include security concepts and mechanisms; security technologies; authentication mechanisms; mandatory and discretionary controls; basic cryptography and its applications; intrusion detection and prevention; information systems assurance; anonymity and privacy issues for information systems. *(Fall, Spring) (Evening)*

ITIS 8210. Access Control and Security Architecture.

(3) Prerequisite: ITIS 8200. This course discusses objectives, formal models, and mechanisms for access control; and access control on commercial off-the-shelf (COTS) systems. This course also examines the issues related to security architectures and technologies for authorization. Topics include cryptographic infrastructure, distributed systems security architectures, Internet security architectures,

network security architectures and e-commerce security architectures.

ITIS 8220. Information and System Assurance. (3)
Prerequisites: ITIS 8200. This course examines the issues related to information and system assurance. Topics include security policy, security threats / vulnerabilities / risks / incidents, assurance requirement, assurance class, evaluation methods and assurance maintenance.

ITIS 8230. Information Infrastructure Protection. (3)
Prerequisite: ITIS 8200. This course examines the issues related to information and system assurance. Topics include security policy, security threats / vulnerabilities / risks / incidents, assurance requirement, assurance class, evaluation methods and assurance maintenance.

ITIS 8240. Applied Cryptography. (3) Prerequisite: Full graduate standing or permission of department. This course provides students with an understanding of modern cryptographic techniques, algorithms and protocols that are of fundamental importance to the design and implementation of security critical applications. The course not only covers standard cryptographic techniques, but also exposes students to the latest advances in applied cryptography. Topics include secret and public key ciphers, stream ciphers, one-way hashing algorithms, authentication and identification, digital signatures, key establishment and management, secret sharing and data recovery, public key infrastructures, and efficient implementation.

ITIS 8342. Information Technology Project Management. (3) Prerequisite: permission of department. Introduce the student to problems associated with managing information technology projects involving, particularly, integration of systems, development of client-specific solutions, and project justification. The course will move beyond the classic techniques of project management and integrate communication software/systems, multi-site, multi-client facilities projects, cultural issues involved with managing interdisciplinary teams, and the effect of rapid technological obsolescence on project justification, funding and continuance.

ITIS 8362. Information Technology Ethics, Policy, and Security. (3) Prerequisites: HADM 6152 or MBAD 6121 or MPAD 6120. Management of Information technology involves understanding the broader issues of ethics, Policy and Security. The growth in Internet usage and E-commerce require IT professionals to consider issues pertaining to data protection, regulation, and appropriate use and dissemination of information. The course is designed to be team-taught by professionals in the field.

ITIS 8400. Principles of Human Computer Interaction. (3) Prerequisite: Full graduate standing, or permission of department. This course will be an introduction to

Human-computer Interaction practice and research. The course will include topics on the perceptual, cognitive, and social characteristics of people, as well as methods for learning more about people and their use of computing systems. We will cover the process of interface design, methods of design, and ways to evaluate and improve a design. The course will also highlight a number of current and cutting-edge research topics in Human- Computer Interaction. The course will be a balance of design, sociological/psychological, and information systems elements.

ITIS 8410. Personalization and Recommender Systems. (3) Cross-listed as ITIS 6410. Prerequisite: Full graduate standing, or permission of the department. This course is an introduction to the application of personalization and recommender systems techniques in information systems. Topics include: historical, individual and commercial perspectives; underlying approaches to content-based and collaborative recommendation techniques for building user models; acceptance issues; and case-studies drawn from research prototypes and commercially deployed systems.

ITIS 8500. Complex Adaptive Systems. (3) Cross-listed as ITIS 6500 and ITCS 6500/8500. Prerequisites: Permission of instructor. Complex adaptive systems (CAS) are networked (agents/part interact with their neighbors and, occasionally, distant agents), nonlinear (the whole is greater than the sum of its parts), adaptive (the system learns to change with its environment), open (new resources are being introduced into the environment), dynamic (the change is a norm), emergent (new, unplanned features of the system get introduced through the interaction of its parts/agents), and self-organizing (the parts organize themselves into a hierarchy of subsystems of various complexity). Ant colonies, networks of neurons, the immune system, the Internet, social institutions, organization of cities, and the global economy are a few examples where the behavior of the whole is much more complex than the behavior of the parts. This course will cover those and similar topics in an interactive manner. Examples of our current research effort will be provided. Topics include: Self-organization; emergent properties; learning; agents; localization affect; adaptive systems; nonlinear behavior; chaos; complexity.

ITIS 8510. Software Agent Systems. (3) Cross-listed as ITIS 6510. Prerequisite: Full graduate standing, or permission of the department. This course will be an introduction to centralized and distributed software agent systems. Topics discussed will include agent cooperation in cooperative and competitive environments, agent architectures, game theoretical models, market mechanisms, multi-agent learning, mixed-initiative computing and single and multi-agent applications. The students will gain hands-on experience by building a multi-agent system as part of a semester-long project in addition to shorter assignments.

Information Technology Research (ITSC)**ITSC 8100. Biological Basis of Bioinformatics. (3)**

Prerequisites: Admission to graduate standing in Bioinformatics and undergraduate training in Computer Science or other non-biological discipline. Provides a foundation in molecular genetics and cell biology focusing on foundation topics for graduate training in bioinformatics and genomics.

ITSC 8101. Energy and Information in Biological Modeling. (3) Prerequisites: Admission to graduate standing in Bioinformatics. This course covers: the major organic and inorganic chemical features of biological macromolecules, the physical forces that shape biological molecules, assemblies and cells, the chemical driving forces that govern living systems, the molecular roles of biological macromolecules and common metabolites, and the pathways of energy generation and storage. Each section of the course builds upon the relevant biology and chemistry to explain the most common mathematical and physical abstractions used in modeling in the relevant context.

ITSC 8110. Introduction to Information Technology Research. (3) Prerequisites: Good standing in the IT Ph.D. Program. Information Technology has a wide range of research areas encompassing the fields of Business Information Systems, Bioinformatics, Computer Science, and Software and Information Systems. This seminar is intended to give IT Ph.D. students a sound understanding of the different research areas in Information Technology. The seminar is to be taken during the first year of studies and is intended to be the gateway to the fields within Information Technology and will enable students to select the fields matching their interests early in their studies. Through attending weekly in-depth research presentations from faculty in all participating units in the Ph.D. IT program and conducting literature surveys in areas of interest, students are expected to gain the knowledge they need to identify the areas of interest for themselves.

ITSC 8111. Bioinformatics Programming I. (3)

Prerequisite: Admission to graduate standing in Bioinformatics. Students in this course will learn how to use object-oriented programming to solve common problems in bioinformatics. Topics covered will include creation and manipulation of relational databases and interfacing with standard bioinformatics programs such as CLUSTAL, BLAST and HMMer. Emphasis will be placed on the creation of memory and time efficient algorithms to handle the large data sets of post-genomic biology.

ITSC 8112. Bioinformatics Programming II. (3)

Prerequisite: ITSC 8111. This is a continuation of Bioinformatics Programming I (ITSC 8111). While the previous course emphasized fundamentals of Bioinformatics programming, this course emphasizes efficiency in speed,

data structures and file size. Students will learn how to optimize code and databases so that the demanding analyses of modern biology can be performed in acceptable amounts of time while minimizing hardware requirements. Topics covered will include algorithm optimization, optimization of database queries and parallel processing to allow bioinformatics calculations to be performed on clusters.

ITSC 8123. Applied Management Science. (3)

Prerequisite; MBAD 6122. Mathematical model building aimed at integrating methods and applications. Overview of mathematical programming in practice and a series of projects implementing models in business and the public sector.

ITSC 8141. Operations Management. (3)

Prerequisite: MBAD 5141 and MBAD 5142 or equivalents. Design, operation, and control of service and manufacturing systems. Emphasis on using analytical tools for problem solving in process analysis and re-engineering, work-force management, materials and inventory management, aggregate planning, total quality management, and others

ITSC 8142. Quality and Manufacturing Management. (3)

Prerequisite: MBAD 6141. Current issues and advances in operations management including just-in-time inventory management, total quality management, continuous improvement, flexible manufacturing systems, computer integrated manufacturing systems, technology evaluation and selection, and operations strategy.

ITSC 8200. Statistics for Bioinformatics. (3)

Prerequisites: ITSC 8100 and 8111 or equivalents. The aim of this 3-credit course is to introduce students to statistical methods used in further more technical courses. Basic relevant concepts from probability, stochastic processes, information theory, statistics and experimental design will be introduced and illustrated by examples from molecular biology, genomics and population genetics with an outline of algorithms and software. R is introduced as the programming language for homework.

ITSC 8201. Molecular Sequence Analysis. (3)

Prerequisite: ITSC 8100 or equivalent. Introduction to bioinformatics methods that apply to molecular sequence. Intro to biological databases online. Sequence databases, molecular sequence data formats, sequence data preparation and database submission. Local and global sequence alignment, multiple alignment, alignment scoring and alignment algorithms for protein and nucleic acids, gene finding and feature finding in sequence, models of molecular evolution, phylogenetic analysis, comparative modeling.

ITSC 8202. Computational Structural Biology. (3)

Prerequisites: ITSC 8101 and 8201, or equivalents. This course will cover: (a) the fundamental concepts of structural biology (chemical building blocks, structure, superstructure,

folding, etc.); (b) software for visualization, visualization styles, publication quality images; (c) the hierarchical nature of biomacromolecular structure classification; (d) computational methods to evaluate and compare biomacromolecular structure; (e) inferring structure/function relationships from structure; and (f) computational prediction of protein and nucleic acid structure from sequence.

ITSC 8203. Genomics, Transcriptomics & Proteomics.

(3) Prerequisites: ITSC 8100 or equivalent, and ITSC 8201. This course surveys the application and interpretation of high-throughput molecular biology and analytical biochemistry methods used to produce the kinds of high-volume biological data most commonly encountered by bioinformaticians. The relationship between significant biological questions, modern biotechnology methods, and the bioinformatics solutions that enable interpretation of complex data is emphasized. Topics include: Genome sequencing and assembly, genome annotation, genome comparison. Genome evolution. Function prediction and gene ontologies. Microarray assay design, data acquisition, data analysis. Proteomics and methods and data analysis. Methods for identification of molecular interactions. Metabolic databases, pathways and models.

ITSC 8204. Mathematical Systems Biology. (3)

Prerequisites: ITSC 8200 and 8210, or equivalents. Introduction to concepts and common methods in systems biology. The class emphasizes molecular networks, models and applications, and covers the following topics: complexity and robustness of cellular systems; hierarchy and modularity of molecular interaction networks; biologically data acquisition for system level modeling; introduction to systems biology markup language (SBML); Bayesian inference of biological systems; stoichiometric and constraint-based modeling; modeling molecular interaction networks with nonlinear ordinary differential equations; quantitative approaches to the analysis of genetic regulatory networks; stochastic modeling of intracellular kinetics; multilevel modeling.

ITSC 8210. Numerical Methods in Bioinformatics. (3)

Prerequisites: Ability to program in a high-level language (Perl, Java, C#, Python, Ruby, C/C++) and Calculus. This course will focus on mathematically complex problems and show students how to implement efficient numerical methods to solve those problems. The focus on the class will depend on instructor expertise but may include: applying linear models and principal component analysis to analysis of microarrays, application of ordinary and partial differential equations to modeling cellular pathways, applying Markov Chains to gene finding and gene predictions algorithms and application of stochastic models and Monte Carlo simulations to molecular dynamics and protein folding.

ITSC 8211. Design and Implementation of Bioinformatics Databases. (3) Prerequisites: ITSC 8111

and 8112 or equivalent. Students will acquire skills needed to exploit public biological databases and establish and maintain personal databases that support their own research; such skills include learning underlying data models and the basics of DBMS, and SQL. Particular topics will include formats and schemas in important bioinformatics databases (Genbank, EMBL, PDB), XML schema and XML exchange methods, using CGI for the query interface, using generic database tools to browse and manage databases (Tomcat and Pgadmin), relevant database applications of SOAP and CORBA, the types of models used in designing databases, and how ontologies (such as GO) affect database design and queries.

ITSC 8310. Analysis of Microarray Data. (3)

This course focuses on recent literature concerning algorithms for analysis of microarray data. The course will start with a review of normal statistics (t-test, ANOVA, etc.) and their non-parametric, robust equivalents. We then turn to primary literature for a survey of the techniques of analyzing microarray data: background subtraction, normalization across samples, assignment of p-values, evaluation of algorithms on control data sets, clustering algorithms, self organizing maps, bootstrap estimations of significance and over-representation of gene ontology terms. Special attention will be given to the problem of appropriate correction of significance for multiple measurements. Students should have fluency in a high-level programming language (PERL, Java, C# or equivalent) and will be expected in assignments to manipulate and analyze large public data sets. The course will utilize the R statistical package with the bioconductor extension.

ITSC 8311. Biophysical Modeling. (3)

This course will cover: (a) overview of mechanical force fields; (b) energy minimization; (c) dynamics simulations (molecular and coarse-grained); (d) Monte-Carlo methods; (e) systematic conformational analysis (grid searches); (f) classical representations of electrostatics (Poisson-Boltzmann, Generalized Born and Colombic); (g) free energy decomposition schemes; and (h) hybrid quantum/classical (QM/MM) methods.

ITSC 8312. Computational Comparative Genomics. (3)

Prerequisite: ITSC 8210 or equivalent. Computational methods for comparative genomics analysis. The course covers the following topics: the architecture of prokaryotic and eukaryotic genomes; the evolutionary concept in genomics. databases and resources for comparative genomics; principles and methods for sequence analysis; evolution of genomes; comparative gene function annotation; evolution of the central metabolic pathways and regulatory networks; genomes and the protein universe; cis-regulatory binding site prediction; operon and regulon predictions in prokaryotes; regulatory network mapping and prediction.

ITSC 8313. Structure, Function, and Modeling of Nucleic Acids. (3) Prerequisites: ITSC 8100 and 8101 or

equivalents. The course covers the following topics: atomic structure, macromolecular structure-forming tendencies and dynamics of nucleic acids; identification of genes which code for functional nucleic acid molecules, cellular roles and metabolism of nucleic acids; 2D and 3D abstractions of nucleic acid macromolecules and methods for structural modeling and prediction; modeling of hybridization kinetics and equilibria; hybridization-based molecular biology protocols, detection methods and molecular genetic methods, and the role of modeling in designing these experiments and predicting their outcome.

ITSC 8600. Seminar. (1) Prerequisites: Admission to graduate standing in Bioinformatics. Departmental seminar. Weekly seminars will be given by bioinformatics researchers from within the university and across the world.

ITSC 8601. Journal Club. (1) Prerequisites: Admission to graduate standing in Bioinformatics. Each week, a student in the class is assigned to choose and present a paper from the primary bioinformatics literature.

ITSC 8699. Graduate Research Seminar (1) Prerequisites: Good standing in the IT Ph.D. Program. This seminar is intended to expose IT Ph.D. students to current research in Information Technology through attending weekly research presentations by other students, IT faculty, and invited speakers. Each student is expected to give one or more presentations for the Graduate Research Seminar before graduation. Students must sign up for and received credit for the Graduate Research Seminar every semester that they are in the IT Ph.D. Program until they are admitted to Ph.D. candidacy. It is graded on Pass/No Credit basis. ITSC 8110 students should not register for ITSC 8699 for the same semester.

ITSC 8880. Individual Study. (3) Prerequisites: permission of department. With the direction of a faculty member, students plan and implement appropriate objectives and learning activities to develop specific areas of expertise through research, reading, and individual projects. May be repeated for credit.

ITSC 8990 Pre-dissertation Research (1-6) Prerequisites: Good standing in the IT Ph.D. Program. Students conduct research in information technology under the direction of one or more IT Ph.D. faculty. A major goal of this course is to prepare the student for the Qualifying Examination. May be repeated for credit.

ITSC 8991. Doctoral Dissertation Research. (1-9) Individual investigation culminating in the preparation and presentation of a doctoral dissertation.

ITSC 9999. Doctoral Degree Graduate Residency Credit. (1))

Business Information Systems (INFO)

INFO 8100. Information Systems Research Methodologies. (3) Prerequisites: Graduate standing or permission of the instructor. A study of statistical and research methods used in information systems research.

INFO 8120. Advanced Research Methodologies. (3) Prerequisites: INFO 8100 or permission of department. A study of advanced research methods used in business administration and management information systems research.

INFO 8201. Data and Knowledge Management in Business. (3) Prerequisite: MBAD 6121 or permission of department and admission to the Ph.D. program in IT. An overview of the business approach to identifying, modeling, retrieving, sharing, and evaluating an enterprise's data and knowledge assets. Covers the organizational, technological and management perspectives.

INFO 8202. Business Information Systems: Analysis, Design, and Management. (3) Prerequisites: MBAD 6121 or permission of department. Examination of managerial issues associated with the study of business processes and the development of supporting information systems. Emphasis on the application of appropriate methodologies, techniques, and tools to analyze, design, and implement business information systems. Study of relevant IS project management and quality assurance techniques.

INFO 8203. Information Systems Economics, Strategy and Policy. (3) Prerequisite: MBAD 6121 or permission of department and admission to the Ph.D. program in IT. This course examines a collection of topics that deal with the strategic use of information systems (IS). These topics include Business Value of IS, Network Economics, use of IS for competitive advantage, IS Planning and policy setting, IS evaluation, selection and sourcing.

INFO 8204. Business Data Communications. (3) Prerequisites: MBAD 6121 or permission of department. Examination of the information communication requirements of business environments, the fundamentals of communication technology, and the application of the technology for solving business problems. Emphasis on understanding communication technologies to assess needs, plan for the introduction of hardware and software, and manage these communication systems.

INFO 8700. Advanced Topics in MIS. (3) Prerequisites: Permission of department. Topics in MIS selected to supplement the regular course offerings. May be repeated for credit as topics vary.)

INFO 8800. Information Systems Research Seminar. (3) Prerequisites: INFO 8100, or permission of department. A study of current research areas in MIS.

INFO 8900. Directed Individual Study in Business Information Systems. (3) Prerequisites: Directed individual study and in-depth analysis of a special area of MIS. The course may be used to satisfy up to six semester hours of graduate credit requirements in the Ph.D. in IT degree program and may be repeated for credit provided a different area of study is undertaken each time. Permission of a member of the doctoral faculty who would direct the study and permission of the department must be secured before registering for the course. *(On demand)*

Operations Management (OPER)

OPER 8122. Technology Enhanced Decision Making. (3) Prerequisites: MBAD 5141 and MBAD 5142 or equivalents. An analytical approach to the management process. Generalized models for decision making with major emphasis on application of the scientific method to management problems. *(On demand)*

OPER 8208. Supply Chain Management. (3) Prerequisites: MBAD 6141; pre- or corequisite: MBAD 6122 or permission of the Department. Supply chain management is concerned with all of the activities performed from the initial raw materials to the ultimate consumption of the finished product. From a broad perspective, the course is designed to examine the major aspects of the supply chain: the product flows; the information flows; and the relationships among supply chain participants. The course content is interdisciplinary in nature and will cover a variety of topics such as supply chain information technologies, supply chain design, strategic alliances between supply chain participants and supply chain initiatives. *(Spring)*

COURSES IN INFORMATION TECHNOLOGY – MASTER’S & POST-GRADUATE

ITIS 5156. Computer-Aided Instruction. (3) Prerequisite: permission of department. History of CAI; study of current CAI systems; development of man-machine dialogue; programming tools for CAI; information structures for computer-oriented learning. Advantages/disadvantages/costs of CAI. *(On demand)*

ITIS 5160. Applied Databases. (3) Prerequisites: full graduate standing, or permission of department. Identification of business database needs; requirements specification; relational database model; SQL; E-R modeling; database design, implementation, and verification; distributed databases; databases replication; object-oriented databases; data warehouses; OLAP; data mining; security of databases; vendor selection; DBMS product comparison; database project management; tools

for database development, integration, and transaction control. *(Fall) (Evening)*

ITIS 5166. Network-Based Application Development. (3) Prerequisite: Full graduate standing or permission of department. This course examines the issues related to network based application development. Topics include introduction to computer networks, web technologies and standards, network based programming methodologies, languages, tools and standards *(Spring) (Evening)*

ITIS 5220. Vulnerability Assessment and System Assurance. (3) Prerequisites permission of department. This course discusses methodologies, tools, and technologies that are important for vulnerability assessment and systems assurance. Topics covered include: ethical hacking techniques, vulnerability assessment, risk assessment/management, finding new exploits, discovering vulnerabilities, penetrating network perimeters, bypassing auditing systems, and assured administration of systems as well as evaluating systems assurance levels. Focus will be placed on 1) understanding current penetration techniques for networks, operating systems, services and applications; 2) investigating mitigation and defense strategies; and 3) studying legal and ethical considerations. The course is based on case studies with a strong lab component. *(On demand)*

ITIS 5250. Computer Forensics. (3) Prerequisite: Enrollment in MS IT or Permission of department. The identification, extraction, documentation, interpretation, and preservation of computer media for evidentiary purposes and/or root cause analysis. Topics include techniques for discovering digital evidence; responding to electronic incidents; tracking communications through networks; understanding electronic media, crypto-literacy, data hiding, hostile code, and Windows™ and UNIX™ system forensics; and the role of forensics in the digital environment. *(On demand)*

ITIS 6010. Topics in Software and Information Systems. (3) Prerequisite: permission of department. Topics in software and information systems selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITIS 6112. Software System Design and Implementation. (3) Cross-listed as ITCS 6112. Prerequisite: permission of department. Introduction to the techniques involved in the planning and implementation of large software systems. Emphasis on human interface aspects of systems. Planning software projects; software design process; top-down design; modular and structured design; management of software projects; testing of software; software documentation; choosing a language for software system. *(Fall) (Spring) (Evenings)*

ITIS 6130. Software Requirements Engineering for Information Systems. (3) Prerequisite: Full graduate

standing, or permission of department. Introduction to requirement engineering methodologies. Topics include: requirements elicitation, specification, and validation; structural, informational, behavioral, security, privacy, and computer user interface requirements; scenario analysis; application of object-oriented methodologies in requirements gathering; spiral development models; risk management models; software engineering maturity model. *(On demand)*

ITIS 6140. Software Testing and Quality Assurance. (3) Prerequisite: ITIS 6112 or permission of department. Methods for evaluating software for correctness and reliability including code inspections, program proofs and testing methodologies. Formal and informal proofs of correctness. Code inspections and their role in software verification. Unit and system testing techniques, testing tools and limitations of testing. Statistical testing, reliability models. Software engineering maturity model. *(On demand)*

ITIS 6148. Advanced OO Design and Implementation. (3) Cross-listed as ITCS 6148. Prerequisites: ITIS 6112, or equivalent courses. This course focuses on issues related to the design, implementation, integration, and management of large object-oriented systems. Topics include: object models, object modeling, frameworks, persistent and distributed objects, and object-oriented databases. *(Spring) (Alternate years)*

ITIS 6150. Software Assurance. (3) Cross-listed as ITIS 8150. Prerequisite: ITIS/ITCS 6112, ITIS/ITCS 8112, ITIS 6177, ITIS 8177, or permission of the department. This course will be an introduction to software assurance education and research. Topics discussed will include the security of software across the development life cycle that addresses trustworthiness, predictable execution and conformance. Various aspects of secure software requirements, design, construction, verification, and validation, process and engineering management will be focused as they relate to secure software development. Students will gain hands-on experience in various techniques and tools as part of a semester-long project in addition to other assignments. *(On demand)*

ITIS 6162. Knowledge Discovery in Databases. (3) Prerequisite: ITCS 6160, full graduate standing, or permission of department. The entire knowledge discovery process is covered in this course. Topics include: setting up a problem, data preprocessing and warehousing, data mining in search for knowledge, knowledge evaluation, visualization and application in decision making. A broad range of systems, such as OLAP, LERS, DatalogicR+, C4.5, AQ15, Forty-Niner, CN2, QRAS, and discretization algorithms will be covered. *(Summer) (Evenings)*

ITIS 6163. Data Warehousing. (3) Cross-listed as ITCS 6163. Prerequisite: ITCS 6160 or equivalent. Topics include: use of data in discovery of knowledge and decision making; the limitations of relational databases and SQL

queries; the warehouse data models: multidimensional, star, snowflake; architecture of data warehouse and the process of warehouse construction; data consolidation from various sources; optimization; techniques for data transformation and knowledge extraction; relations with enterprise modeling. *(On demand)*

ITIS 6164. Online-Info Systems. (3) Prerequisites: ITCS 6114 or permission of department. The fundamental concepts and philosophy of planning and implementing an online computer system. Characteristics of online systems; hardware requirements; modeling of online systems; performance measurement; language choice for online systems; organization techniques, security requirements; resource allocation. *(On demand)*

ITIS 6167. Network Security. (3) Prerequisite: ITIS 6200 or equivalent. This course examines the issues related to network security. Topics include network security background and motivation, network centric threats, network authentication and identification, network security protocols, firewall, IDS, security in wireless environments, email security, instant message security, network application security, and network based storage security. There are heavy lab based components in this course. *(Fall) (Evening)*

ITIS 6177. System Integration. (3) Prerequisite: ITIS 5166 and ITIS 5160, or equivalents. This course examines the issues related to system integration. Topics include: data integration, business process integration, integration architecture, middleware, system security, and system management. *(Fall) (Evening)*

ITIS 6198. IT Internship Project. (3) Prerequisite: permission of department. Complete a team-based project that is originated from an IT organization and approved by the department.

ITIS 6200. Principles of Information Security and Privacy. (3) Prerequisite: Permission of department. Topics include security concepts and mechanisms; security technologies; authentication mechanisms; mandatory and discretionary controls; basic cryptography and its applications; database security, intrusion detection and prevention; assurance requirement, assurance class, evaluation methods and assurance maintenance; anonymity and privacy issues for information systems. *(Fall, Spring) (Evening)*

ITIS 6210. Access Control and Security Architecture. (3) Prerequisite: ITIS 6200. This course discusses objectives, formal models, and mechanisms for access control; and access control on commercial off-the-shelf (COTS) systems. This course also examines the issues related to security architectures and technologies for authorization. Topics include cryptographic infrastructure, distributed systems security architectures, database systems security architectures, Internet security architectures, network security architectures and e-commerce security architectures.

(Spring) (Evening)

ITIS 6230. Information Infrastructure Protection. (3) Prerequisite: ITIS 6200. This course discusses methodologies, tools, and technologies that are important for protecting information systems and information infrastructures. Topics covered include: techniques, processes and methodologies for information security risk assessment and management, tools and technologies for critical infrastructure protection, methodologies for continuous operation and recovery from disasters. *(On demand)*

ITIS 6240. Applied Cryptography. (3) Prerequisite: Full graduate standing or permission of department. This course provides students with an understanding of modern cryptographic techniques, algorithms and protocols that are of fundamental importance to the design and implementation of security critical applications. The course not only covers standard cryptographic techniques, but also exposes students to the latest advances in applied cryptography. Topics include secret and public key ciphers, stream ciphers, one-way hashing algorithms, authentication and identification, digital signatures, key establishment and management, secret sharing and data recovery, public key infrastructures, and efficient implementation. *(On demand)*

ITIS 6342. Information Technology Project Management. (3) Prerequisite: Permission of department. Introduce the student to problems associated with managing information technology projects involving, particularly, integration of systems, development of client-specific solutions, and project justification. The course will move beyond the classic techniques of project management and integrate communication software/systems, multi-site, multi-client facilities projects, cultural issues involved with managing interdisciplinary teams, and the effect of rapid technological obsolescence on project justification, funding and continuance. *(Spring)*

ITIS 6362. Information Technology Ethics, Policy, and Security. (3) Prerequisite: Permission of department Management of Information technology involves understanding the broader issues of ethics, policy and security. The growth in Internet usage and E-commerce require IT professionals to consider issues pertaining to data protection, regulation, and appropriate use and dissemination of information. The course is designed to be team-taught by professionals in the field. *(Fall)*

ITIS 6400. Principles of Human Computer Interaction. (3) Prerequisite: Full graduate standing, or permission of department. This course will be an introduction to Human-computer Interaction practice and research. The course will include topics on the perceptual, cognitive, and social characteristics of people, as well as methods for learning more about people and their use of computing systems. We will cover the process of interface design, methods of design, and ways to evaluate and improve a

design. The course will also highlight a number of current and cutting-edge research topics in Human- Computer Interaction. The course will be a balance of design, sociological/psychological, and information systems elements. *(Spring)*

ITIS 6410. Personalization and Recommender Systems. (3) Cross-listed as ITIS 8410. Prerequisite: Full graduate standing, or permission of the department. This course is an introduction to the application of personalization and recommender systems techniques in information systems. Topics include: historical, individual and commercial perspectives; underlying approaches to content-based and collaborative recommendation techniques for building user models; acceptance issues; and case-studies drawn from research prototypes and commercially deployed systems. *(On demand)*

ITIS 6500. Complex Adaptive Systems. (3) Cross-listed as ITIS 8500 and ITCS 6500/8500. Prerequisite: Permission of instructor. Complex adaptive systems (CAS) are networked (agents/part interact with their neighbors and, occasionally, distant agents), nonlinear (the whole is greater than the sum of its parts), adaptive (the system learns to change with its environment), open (new resources are being introduced into the environment), dynamic (the change is a norm), emergent (new, unplanned features of the system get introduced through the interaction of its parts/agents), and self-organizing (the parts organize themselves into a hierarchy of subsystems of various complexity). Ant colonies, networks of neurons, the immune system, the Internet, social institutions, organization of cities, and the global economy are a few examples where the behavior of the whole is much more complex than the behavior of the parts. This course will cover those and similar topics in an interactive manner. Examples of our current research effort will be provided. Topics include: Self-organization; emergent properties; learning; agents; localization affect; adaptive systems; nonlinear behavior; chaos; complexity. *(On demand)*

ITIS 6510. Software Agent Systems. (3) Cross-listed as ITIS 8510. Prerequisite: Full graduate standing, or permission of the department. This course will be an introduction to centralized and distributed software agent systems. Topics discussed will include agent cooperation in cooperative and competitive environments, agent architectures, game theoretical models, market mechanisms, multi-agent learning, mixed-initiative computing and single and multi-agent applications. The students will gain hands-on experience by building a multi-agent system as part of a semester-long project in addition to shorter assignments. *(On demand)*

ITIS 6880. Individual Study. (1-3) Prerequisites: At least 9 graduate ITCS/ITCS hours and permission of department. With the direction of a faculty member, students plan and implement appropriate objectives and learning activities to develop specific areas of expertise through research, reading,

and individual projects. May be repeated for credit. (*On demand*)

ITIS 6991. Information Technology Thesis. (1-6)

Prerequisite: full standing in the Master of Science in Information Technology program and permission of department. Graduate thesis research. A detailed exploration of an area of information technology chosen for thesis research. May be repeated for credit but no more than six hours may be applied to the M.S. degree requirements. (*Fall, Spring, Summer*)



College of Education

<http://education.uncc.edu/coe>

Dean: Mary Lynne Calhoun

Associate Dean: Melba Spooner

Assistant Dean: Andrea Moshier

*Director of the Office of Teacher Education Advising and Licensure:
Sam F. Nixon*

Director of the Office of Field Experiences: Joyce Frazier

Director of the Office of Educational Outreach: Victor B. Mack

Director of the Teaching Fellows Program: Misty L. Cowan-Hathcock

*Director of the Center for Math, Science, and Technology Education:
David C. Royster*

Instructional Technology: Lonnie Bateman, Ed Conway, Dane Hughes

At the University of North Carolina at Charlotte, graduate students in the College of Education have many different opportunities to expand their knowledge and skills in preparation for new educational roles and increased leadership responsibilities. While many professional education programs lead to advanced NC licensure, other programs lead to both initial and advanced licensure, and still others are not associated with licensure. The College of Education is accredited by the National Council for Accreditation of Teacher Education. All licensure programs are approved by the North Carolina Department of Public Instruction. Program graduates positively influence their peers, clients, and students; contribute to the development of effective schools and agencies for all children; and work to alleviate and prevent many of today's educational and social obstacles.

One of the college's most important functions is to serve as a regional resource in education, research, and service to help address the challenges of urban schools. The college has a strong partnership with the 13 school districts in the region and is located within the bounds of Charlotte-Mecklenburg Schools (CMS), a large urban district enrolling more than 134,000 students.

Doctoral Programs

- **Doctor of Education (Ed.D.)**
 - Educational Leadership: School Specialization and Community Specialization

- **Doctor of Philosophy (Ph.D.)**

- Counseling
- Curriculum and Instruction: Urban Education, Elementary Education, Literacy Education, or Mathematics Education
- Special Education

Master's Degree Programs

- **Master of Arts (M.A.)**

- Counseling: Agency
- Counseling: School (*Licensure program*)
- English Education (*Advanced licensure – also see English Department*)
- Mathematics Education (*Advanced licensure – also see Mathematics Department*)

- **Master of Arts in Teaching (M.A.T.)**

(Combines initial and advanced licensure)

- Elementary Education
- Fine and Performing Arts Education: Art, Dance, Music, or Theatre
- Foreign Language Education: French, German, or Spanish
- Middle Grades Education: English/Language Arts, Mathematics, Science, or Social Studies
- Secondary Education: English, Mathematics, History/Comprehensive Social Studies, Comprehensive Science, Biology, Chemistry, Earth Sciences, or Physics

- Special Education: General Curriculum or Adapted Curriculum
- Teaching English as a Second Language
- **Master of Education (M.Ed.)**
(*Advanced licensure*)
 - Child and Family Studies (B-K) (*Also offers combination of initial and advanced licensure*)
 - Curriculum and Supervision
 - Elementary Education
 - Instructional Systems Technology (*Also offers a non-licensure track*)
 - Middle/Secondary Education
 - a) Middle Grades track: English Language Arts, Mathematics, Science, or Social Studies
 - b) Secondary Education track: History/Comprehensive Social Studies, Comprehensive Science, Biology, Chemistry, Earth Sciences, or Physics
 - Reading Education
 - Special Education
 - a) Academically Gifted
 - b) Adapted Curriculum
 - c) General Curriculum
 - Teaching English as a Second Language
- **Master of School Administration (M.S.A.)** (*Advanced licensure*)
 - School Administration

Graduate Non-Degree Programs

- **Graduate Certificate in Teaching**
 - Child and Family Development
 - Elementary Education
 - Fine and Performing Arts Education: Art, Dance, Music, or Theatre
 - Foreign Language Education: French, German, or Spanish
 - Middle Grades Education: English Language Arts, Mathematics, Science, or Social Studies
 - Secondary Education: English, Mathematics, History/Comprehensive Social Studies, Comprehensive Science, Biology, Chemistry, Earth Sciences, or Physics
 - Special Education: General Curriculum or Adapted Curriculum
 - Teaching English as a Second Language
- **Other Graduate Certificate Programs**
 - Child and Family Development: Early Intervention
 - Curriculum and Supervision

- Instructional Systems Technology
- Play Therapy
- School Administration
- School Counseling
- Special Education: Academic or Intellectually Gifted
- Substance Abuse Counseling

Child and Family Studies: Early Education

- **Master of Education (M.Ed.)**
- **Graduate Certificate**

Department of Special Education and Child Development

348 College of Education
704-687-8830
<http://education.uncc.edu/spcd>

Coordinator

Dr. Suzanne Lamorey

Graduate Faculty

Deana Deason, Lecturer
Bonnie Keilty, Assistant Professor
Suzanne Lamorey, Associate Professor
Lyn Rhoden, Associate Professor
Bobbie Rowland, Professor Emeritus
Pamela Shue, Assistant Professor
JaneDiane Smith, Associate Professor
JoAnn Springs, Clinical Assistant Professor

MASTER OF EDUCATION IN CHILD AND FAMILY STUDIES: EARLY EDUCATION

The M.Ed. in Child and Family Studies: Early Education prepares professionals for leadership positions that serve young children with and without disabilities and their families. It is conveniently designed for prospective students already working full-time in professional settings who wish to pursue an advanced degree on a part-time basis and for those who wish to pursue a degree on a full-time basis. There are three different tracks within the M.Ed. program-

2 for candidates seeking both initial and advanced birth-kindergarten [B-K] licensure and one track for individuals with an initial B-K license seeking advanced licensure. The graduate degree program is for professionals who teach or provide services or interventions in infant, toddler, and preschool and kindergarten settings that include young children with and without disabilities; who administer preschool and family agency programs that have a child development and family relations focus; who work as consultants, parent educators, inclusion specialists, program coordinators, supervisors, and staff development trainers; or who seek research and evaluation expertise in child and family studies and community leadership in child and family programs. Graduates will qualify for the Master's Level "advanced competencies" Birth-Kindergarten (B-K) Teaching License issued by the North Carolina Department of Public Instruction upon completion of the program.

Program Objectives

The M.Ed. degree in Child and Family Studies: Early Education prepares each advanced master's degree student with skills to:

- 1) Integrate and apply empirical and theoretical knowledge of the growth and development of young children with and without disabilities
- 2) Conduct research on individual and family development and behavior
- 3) Employ interdisciplinary approaches to the study of child development, the family, and other social institutions that include the influence of social context and policy variables on children and their families
- 4) Take leadership roles in programs that support the development of infant, toddler, preschool, and kindergarten children with and without disabilities
- 5) Demonstrate advanced knowledge and understanding of interrelationships of families, family dynamics, and children within these contexts
- 6) Design and evaluate inclusive learning environments that promote the development of children of all developmental levels and abilities

Degree Requirements

The M.Ed. in Child and Family Studies: Early Education requires a total of 39 semester hours of course work.

Track A: For candidates with a B-K license:

Core Courses (18 hours)

- CHFD 6000 Topics in Child and Family Development (3)
- CHFD 6102 Learning and Development (3)
- CHFD 6200 Curriculum and Learning Environments for Young Children (3)
- CHFD 6210 Inclusive Educ for Young Children (3)
- CHFD 6220 Family Theory and Research (3)
- CHFD 6230 Emerging Literacy and Mathematical Understanding (3)

Applied Research/Evaluation (6 hours)

- RSCH 6101 Research Methods (3)
- CHFD 6900 Research in Child and Family Studies (3)

Thematic Electives (9 hours)

To be selected from the categories of Education of Young Children; Family Studies; Early Intervention; Administration/Supervision; or individually planned option, with advisor approval.

Internship/Seminar (6 hours)

- CHFD 7400 Applied Leadership in Child and Family Studies (3) (s)
- CHFD 7600 Seminar: Leadership in the Education of Children and Families (3)

Track B: Candidates with an elementary or special education teaching license but without a B-K license:

Phase 1 (18 hours):

- CHFD 6200 Curriculum and Learning Environments for Young Children (3)
- CHFD 6220 Family Theory and Research (3)
- CHFD 6230 Emerging Literacy and Mathematical Understanding (3)
- CHFD 6240 Advanced Studies in Infant and Child Development (3)
- SPED 5111 Issues in Early Intervention (3)
- SPED 5210 Methods in Early Intervention: B - K (3)

Phase 2 (21 hours)

- RSCH 6101 Research Methods (3)
- SPED 5112 Assessment of Young Children with Disabilities: B - K (3)
- CHFD 6130 Concepts of Teaching and Learning: Child's Play (3)
- CHFD 6210 Inclusive Educ for Young Children (3)
- CHFD 6900 Research in Child and Family Studies (Master's Project/Thesis) (3)
- CHFD 7400 Applied Leadership in Child and Family Studies (3)
- CHFD 7600 Seminar: Leadership in the Education of Children and Families (3)

Track C: Individuals with a provisional (lateral entry) or emergency teaching license and those without a teaching license:

Phase 1 (27 hours):

- CHFD 6102 Learning and Development (3)
- CHFD 6200 Curriculum & Learning Environments (3)
- CHFD 6220 Family Theory and Research (3)
- CHFD 6230 Emerging Literacy and Mathematical Understanding (3)
- CHFD 6240 Advanced Studies in Infant and Child Development (3)
- CHFD 6400 Internship: Child and Family Studies (3)
- SPED 5111 Issues in Early Intervention (3)
- SPED 5112 Assessment of Young Children with Disabilities: B-K (3)

SPED 5210 Methods in Early Intervention: B - K (3)

Phase 2 (12 hours)

- RSCH 6101 Research Methods (3)
- CHFD 6900 Research in Child and Family Studies (Master's Project/Thesis) (3)
- CHFD 7400 Applied Leadership in Child and Family Studies (3)
- CHFD 7600 Seminar: Leadership in the Education of Children and Families (3)

Admission Requirements

- 1) A completed online application accompanied by the application fee
- 2) Evidence of a bachelor's degree from an accredited college or university
- 3) Official transcripts of all previous academic work showing evidence of an overall grade point average (GPA) of 2.75 or above and a junior/senior GPA of 3.0 or above
- 4) Evidence of satisfactory scores on the Graduate Record Examination (GRE) or the Miller Analogies Test (MAT)
- 5) A personal statement outlining why the applicant seeks admission to the program and describing professional experiences with young children and their families
- 6) Three letters of recommendation from persons familiar with the applicant's personal or professional qualifications

Admission to Candidacy Requirements

Upon successful completion of a minimum of 24 semester hours of graduate work and in no case later than four weeks prior to the beginning of the semester in which he/she expects to complete all requisites for the degree, a student should file for admission to candidacy on a form supplied by the Graduate School. This application is a check sheet approved by the student's advisor and graduate coordinator listing all course work to be offered for the degree (including transferred credit and courses in progress).

Assistantships

Each Department in the College of Education funds a limited number of graduate teaching assistantships. Information about these assistantships, including application materials, is available in the department office.

Internships

The internship is an intensive, culminating experience in which students assume a professional role in a child and family development setting and demonstrate the ability to provide direct services, to apply research and theory in a field-based setting, and to assume leadership roles. A minimum of 200 clock hours is required.

Advising

Upon admission, each student is assigned a faculty advisor who helps the student develop his or her program of study and must approve that program of study. Each student must

also assemble a graduate committee for consultation and evaluation. Members of the committee include the student's faculty advisor and at least two other faculty members who represent major areas of concentration in the student's program.

Licensure

Candidates enrolled in Track B or C will qualify for the initial level B-K Teaching License issued by the North Carolina Department of Public Instruction upon completion of the first part of their program. Graduates will qualify for the Master's Level "advanced competencies" Birth-Kindergarten (B-K) Teaching License issued by the North Carolina Department of Public Instruction upon completion of the program.

Comprehensive Exam

An oral exam may follow the student's master's project/thesis completion. The oral exam is designed to provide the student with feedback from the members of the student's graduate committee about the written project/thesis.

Committees

Students should consult with their academic program advisor in the selection of the committee. The following guidelines are intended to assist the student and his or her academic program advisor in constituting the master's committee.

- 1) Chair - selected for content knowledge of the subject area that is selected for the culminating experience. This person may be, but need not be, from your department. It is recommended, however, that this person hold a graduate faculty appointment in your department
- 2) Second and third members - selected for knowledge and expertise in the subject area (can be external to your department)
- 3) Technical advisor - (Thesis and Research Projects only) - selected for technical support (e.g., specialized skills in program evaluation, technical writing, assessment, curriculum design, graphics, ethnography, and survey research methodology). This person may be, but need not be from your department
- 4) Additional members - may be added if the committee chair agrees. These members may be from -departments of the College other than your department, and may be from other colleges in the University or from outside the University with the prior written permission of the Dean of the Graduate School. (This whole process should start at the beginning of the semester prior to graduation. However, the student may begin anytime after completing 18 hours.)

Master's Project/Thesis

The nature of the project/thesis is developed by the student in consultation with the major professor and presented to the Advisory Committee for approval. The project is usually something that is practical and will be useful to the student in the professional role that will be assumed upon the

completion of the degree. The thesis takes a more research-oriented approach.

Research Opportunities/Experiences

Students have the option of completing either an applied master's project or a research project/thesis related to their specialty area.

Program Certification/Accreditation

The College of Education is accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction (NCDPI) to offer a master's degree program in Child and Family Studies: Early Education. Graduates will qualify for the Master's/Advanced Competencies "M" license and prepare them to pursue national certification through the National Board for Professional Teaching Standards (NBPTS).

GRADUATE CERTIFICATE IN CHILD AND FAMILY DEVELOPMENT: EARLY INTERVENTION

The Graduate Certificate in Child and Family Development: Early Intervention is a 12-hour program. The certificate provides students with some of the coursework on services for infants, toddlers, and preschoolers with disabilities or at-risk of developmental delays that is required in order to obtain a North Carolina initial teaching license Birth-Kindergarten (B-K). Course content addresses current issues, service models for young children with disabilities, appropriate assessment, effective early intervention, and building more inclusive environments for young children with disabilities.

Course Requirements

- SPED 5111 Issues in Early Intervention for Children with Disabilities (3)
- SPED 5112 Assessment of Young Children w/ Disabilities: B - K (3)
- SPED 5210 Methods in Early Intervention: B - K (3)
- CHFD 6210 Inclusive Education for Young Children (3)

Admissions Requirements

- 1) Students must have a bachelor's degree from a regionally accredited university.
- 2) Students must provide original transcripts that indicate a minimum overall GPA of at least 2.75 and a junior/senior GPA of at least 3.0.
- 3) Students are not required to take the GRE or MAT. However, student's wishing to apply Graduate Certificate coursework to the M.Ed. must take the GRE or MAT prior to being admitted to the Child and Family Development graduate program.

- 4) The twelve (12) hours taken toward a Graduate Certificate may be applied to the advanced master's degree program in Child and Family Development with the permission of the graduate program coordinator and the Graduate School.
- 5) Admission to the Graduate Certificate program does not ensure admission to the master's degree program.

COURSES IN CHILD AND FAMILY DEVELOPMENT

CHFD 5000. Topics in Child and Family Development.

(1-6) May include classroom and/or clinical experiences in the content area. With department approval, may be repeated for credit for different topics. (*Fall, Spring, Summer*)

CHFD 6000. Topics in Child and Family Development.

(1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit for different topics. (*Fall, Spring, Summer*)

CHFD 6100. Adjustment Issues: Children in Family

Context. (3) Study of adjustment problems of childhood and adolescence with emphasis on the context and patterns of the family-of-origin system that influence behavior and attitudes as children with and without disabilities grow and develop. (*On demand*)

CHFD 6102. Learning and Development.

(3) In-depth study of selected theories of learning and development. (*Fall, Spring, Summer*) (*Evenings*)

CHFD 6110. Parenting Education.

(3) Prerequisite or corequisite: CHFD 6102. An examination of the principles and practices of parenting education in terms of research, program implementation, evaluation, and collaboration. In-depth study of developmental designs, supportive programs designed to prevent problems, and programs and organizations which respond to parent needs and interests. Emphasis is placed on the process of parent involvement, communication, and collaborative leadership. (*On demand*)

CHFD 6115. Child and Family Advocacy.

(3) Prerequisite: CHFD 6102. Study of the principles and practices of child and family advocacy. (*On demand*)

CHFD 6120. Creativity, Learning Environments and

Experiences. (3) Investigation of theories of creativity and their relationship to curriculum development. (*On demand*)

CHFD 6130. Concepts of Teaching and Learning:

Children's Play. (3) Examination of theories, trends and current practices in children's play. (*On demand*)

CHFD 6200. Curriculum and Learning Environments for

Young Children. (3) Prerequisite or corequisite: CHFD 6102. Theoretical and research foundations for designing,

implementing, adapting, and evaluating curriculum that is responsive to the needs of young children with and without disabilities. Observational strategies are used to assess both the child (individual, sociocultural, and developmental characteristics) and the environment in order to identify best practices. *(Spring)*

CHFD 6210. Inclusive Education for Young Children. (3) Prerequisite or corequisite: CHFD 6102. Inclusive education provides the opportunity for children with and without developmental disabilities to learn together. Inclusive early childhood curricula and instructional strategies are emphasized as is the professional role of interdisciplinary team member. Legislative mandates for inclusion are studied. *(Fall)*

CHFD 6220. Family Theory and Research. (3) Prerequisite or corequisite: CHFD 6102. Study of family theories and research which employ the contextual framework of the family as a system and which explain family of origin, family functioning, family structure, and family process. Application of theory and research will include an understanding of the various levels of family functioning as a model for developing family support and intervention plans. *(Fall)*

CHFD 6230. Emerging Literacy and Mathematical Understanding. (3) Prerequisite or corequisite: CHFD 6102. Emergent development of literacy and mathematical understanding in the home and preschool settings for young children with and without disabilities. Language and cognitive development theories and research are linked to home and classroom experiences that enhance literacy and mathematical understanding through developmentally appropriate practices. *(Spring)*

CHFD 6240. Advanced Studies in Infant and Child Development. (3) Prerequisite: CHFD 6102. An advanced course to extend knowledge of infant, toddler, and preschool development of children with and without disabilities. Developmental domains of infants and young children and their relationships within family and society will be emphasized. *(Fall)*

CHFD 6400. Internship in Child and Family Studies. (3) Prerequisites: Completed application to internship and departmental approval. Supervised, field-based experiences in observation, instruction and administration of programs for young children in birth-kindergarten settings. Includes on-campus seminars. *(Fall, Spring)*

CHFD 6800. Individual Study in Child and Family Studies. (1-6) Prerequisite: a written plan of study approved by the student's advisor and the individual study director. Designed to allow a student to pursue specialty interests under the supervision of an appropriate faculty member. Permission of the student's advisor and appropriate individual study director. May be repeated for credit. *(Fall, Spring, Summer)*

CHFD 6900. Research in Child and Family Studies (Master's Project/Thesis). (3) Prerequisites: RSCH 6101; completion of at least 24 hours of graduate program. Design, implementation, presentation, and evaluation of an approved applied research project in student's specialty area. The applied project is of the student's own design under the supervision of an advisor and graduate committee. Graded Pass/No Credit only. *(Fall)*

Advanced Graduate Only

CHFD 7135. Readings in Learning and Development. (3) Examines research data about the development of human behavior interpreted in terms of multiple disciplines, including psychology, anthropology and ethnology. *(On demand)*

CHFD 7400. Applied Leadership in Child and Family Studies. (3) Prerequisite: completion of at least 30 hours of graduate program. Corequisite: CHFD 7600. An intensive, professional supervised field-based experience in which students demonstrate the ability to provide direct service, to apply research and theory in a field-based setting, and to assume leadership roles. A minimum of 200 clock hours is required. *(Spring)*

CHFD 7600. Seminar: Leadership in Education of Children and Families. (3) Prerequisite: completion of at least 24 hours of graduate program. Corequisite: CHFD 6400. A synthesizing course of study focusing on review, compilation, analysis, and evaluation of the literature, research, and experiences relevant to the student's specialty area. Students will demonstrate leadership by conducting a program evaluation, creating innovative solutions to challenges, and initiating and creating collaboration among persons and across agencies. *(Spring)*

CHFD 7999. Master's Degree Graduate Residency Credit. (1) Meets Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive examination. *(Fall, Spring, Summer)*

Counseling

- **Ph.D. in Counseling**
- **M.A. in Counseling**
- **Graduate Certificate in Play Therapy**
- **Graduate Certificate in Substance Abuse Counseling**
- **Post-Master's Certificate in School Counseling**

Department of Counseling

College of Education

704-687-8960

<http://education.uncc.edu/counseling>**Program Coordinators**

Dr. Kok-Mun Ng – Doctoral coordinator

Dr. Henry L. Harris – Master's coordinator

Dr. Phyllis Post – Certificate in Play Therapy

Dr. Pam Lassiter – Certificate in Substance Abuse
Counseling

Dr. Edward Wierzalis – Certificate in School Counseling

Graduate Faculty

Lyndon Abrams, Associate Professor

Valerie Balog, Clinical Assistant Professor

Peggy Ceballos, Assistant Professor

Jack Culbreth, Associate Professor

Susan Furr, Professor

Henry Harris, Associate Professor

Pam Lassiter, Assistant Professor

Kok-Mun Ng, Associate Professor

Phyllis Post, Professor

Clarrice Rapisarda, Assistant Professor

Ed Wierzalis, Clinical Assistant Professor

PH.D. IN COUNSELING

The Ph.D. in Counseling is designed to provide doctoral-level preparation for professionals who seek higher education positions in counselor preparation programs and advanced clinical training and leadership positions in the counseling field. A unique feature of this program is its emphasis on increasing knowledge, awareness, and skills in interacting with socially and culturally diverse populations. Doctoral-level counselors may work as counselor supervisors, direct service providers, counselor educators, program consultants, researchers, program evaluators, and in other roles that require leadership in the areas of human services, family development, community organizations, and counseling. Potential employment settings include institutions of higher education, schools, hospitals, employee assistance programs, substance abuse treatment centers, community mental health agencies, and private practice centers.

The Ph.D. in Counseling requires a minimum of 60 semester hours beyond those earned in an accredited master's program of at least 48 semester hours. Advanced preparation will be required in the following areas:

- 1) Implications of ways in which diversity (e.g., race, gender, age, religion, spirituality, ethnicity, mental/physical ability, nationality, and sexual orientation) influence counseling practice and counselor education.

- 2) Theories pertaining to the principles and practice of counseling, career development, group work, and consultation.
- 3) Clinical skill development in counseling, group work, and consultation.
- 4) Theories and practice of counselor supervision.
- 5) Design and implementation of quantitative research and methodology (e.g., univariate, multivariate, single subject design).
- 6) Design and implementation of qualitative research and methodology (e.g., grounded theory, ethnography, and phenomenological methodologies).
- 7) Models and methods of assessment and use of data.
- 8) Ethical and legal considerations in counselor education and supervision.
- 9) Instructional theory and methods relevant to counselor education.

Program Objectives

- 1) To acquire, integrate, and apply empirical and theoretical knowledge of the field of counseling.
- 2) To develop leadership skills in counselor education, supervision, advanced counseling practice, and research.
- 3) To apply advanced skills and competencies in field-based settings.
- 4) To conduct research and generate new knowledge in counseling.
- 5) To design, adapt, and evaluate curricula in the field of counseling.
- 6) To develop depth and breadth in professional growth and continued life-long learning.
- 7) To examine the influence of social context and policy variables on human behavior.
- 8) To show increased sensitivity and clinical skills that demonstrate awareness of the diversity of race, gender, age, religion, ethnicity, mental/physical ability, nationality, and sexual orientation as relevant to counseling professionals.

In addition to a 150-hour clinically based doctoral practicum, doctoral students will participate in internship experiences of at least 600 clock hours that may include counselor education, supervision, advanced counseling practice, and research.

Students also collaborate with faculty as a part of their Professional Development plan in teaching, supervision, counseling services, research, professional writing, and service to the community, region, and profession.

Prerequisite Requirements

Applicants should possess a CACREP-approved Master's Degree in counseling with a cumulative GPA of 3.5 (on a scale of 4.0) or higher. Students with master's degrees requiring less than 60 semester hours or degrees from non-CACREP-approved Master's programs may need to complete prerequisite courses. Two years of experience as a professional counselor preferred.

Degree Requirements and Course Scheduling

Year One

Fall

CSLG 8000 Doctoral Seminar (1)
 CSLG 8100 Advanced Counseling Theories
 CSLG 8345 Advanced Multicultural Counseling
 RSCH 8210 Applied Research Methods

Spring

CSLG 8431 Doctoral Practicum in Counseling
 CSLG 8346 Applied Multicultural Counseling
 RSCH 8110 Statistics I
 CSLG 8000 Seminar in Career Development (1)
 Elective

Summer

CSLG 8203 Instructional Theories
 Elective

Year Two

Fall

CSLG 8110 Clinical Supervision in Counseling
 CSLG 8998 Prospectus Design
 RSCH 8120 Statistics II
 Elective

Spring

CSLG 8410 Practicum in Clinical Supervision
 RSCH 8140 Multivariate Statistics OR
 RSCH 8111 Qualitative Methods
 Elective

Summer

CSLG 8999 Dissertation

Year Three

Fall

CSLG 8440/8445 Internship
 CSLG 8000 Advanced Practicum in Group
 Counseling (1)
 CSLG 8999 Dissertation

Spring

CSLG 8999 Dissertation
 CSLG 8445 Internship II

Admission to Candidacy Requirements

Students are considered candidates for the doctoral degree on successful completion of the Comprehensive Examination and acceptance of the Dissertation Proposal.

Assistantships

Limited Graduate Assistantships are available in the Department of Counseling and various offices on campus. Applications must be submitted to individual departments/offices.

Practicum

A Doctoral Practicum is taken in the first year of study. The practicum requires 150 hours over the course of a semester at an approved site in the community. The Practicum will involve the acquisition of new skills and learnings regardless of the site selected.

Internships

Doctoral students are required to complete a total of 600 clock hours (over two semesters) of internship (CSLG 8440/5). The internship experience shall include supervised experiences in counselor education and supervision (e.g., clinical practice, research, and teaching) that reflect new learning. Students and their doctoral advisors develop collaboratively components of their internship experiences in accordance with relevant CACREP standards.

Electives

There are two required elective courses in the curriculum. These are most commonly taken within the Counseling curriculum but may be taken in other departments as long as the courses are designated at the 8000 level.

Advising

Students will select a program advisor during the first fall semester in the program. The program advisors assist students during the initial stages of the program. By the end of the students' first semester the advisor will have assisted the student in forming a program advisory committee and developing a Program of Study. The Program of Study must be approved by and filed with the Doctoral Program Coordinator. Advisors will also assist students in identifying faculty whose research interests and expertise are congruent with the student's probable area of inquiry for the dissertation. The assistance of the advisor does not relieve the student of responsibility for completing required work and following departmental and university procedures. Following the comprehensive exam, the students will select a dissertation advisor/chair and committee. The program advisors continue to provide academic advisement to the students through their program, regardless of whether they are part of the students' dissertation committee.

Comprehensive Exam

The main objective of the written portion of the qualifying exam is to ensure that the student is adequately prepared to write a dissertation to complete the Ph.D. degree requirements. Being prepared means the following:

- 1) Examinees must be able to analyze and synthesize information obtained from coursework and research within a multicultural counseling context.
- 2) Examinees must demonstrate advanced knowledge in the core areas of supervision and counseling theory.
- 3) Examinees must demonstrate competencies in research methodology and evaluation.

The exam will be a 2-day exam administered on campus prior to the beginning of the fall, spring, and summer semesters.

Dissertation Committee

A Dissertation Committee comprised of at least five faculty members will be formally appointed for each student after admission to candidacy. At least three committee members must be on the Counseling Program faculty and one member will be appointed by the Graduate School. A person outside the university may serve as a full member of the Dissertation Committee in situations where knowledge or expertise of a particular nature is desired. With the mutual consent of the student and the faculty member, a faculty member who is recommended by the Doctoral Program Coordinator and appointed by the Department Chair will be designated to serve as the Chair of the Doctoral Committee. The Chair of the Doctoral Committee, following appointment, will be the advisor and coordinator of the student's doctoral study. Chairs of Doctoral Committees are specifically responsible for seeing that the student progresses in an expeditious manner towards completion of the degree. Chairs will assist students in organizing committee meetings, conducting original research, presenting the proposal, and organizing the dissertation defense. Eligible faculty are all tenured faculty (Professor/Associate Professor), as well as Assistant Professors who have been reappointed for their second term. Each appointed Committee Member will have both voice and vote on all relevant matters pertaining to a doctoral student's progress towards the degree. At least four committee members must be present for the oral defense of the dissertation. The oral defense is considered satisfactory upon the positive vote of at least four committee members. Prior to and following the appointment of this committee students are encouraged to work with faculty on dissertation ideas.

Dissertation

Each candidate for the doctoral degree is required to prepare and present a dissertation that shows independent investigation and is acceptable in form and content to the Dissertation Committee. A doctoral dissertation must demonstrate the candidate's ability to conceive, design, conduct, and interpret independent, original, and creative research and must make a unique contribution to knowledge in the field of counseling. Under the direct supervision of the Doctoral Committee Chair, students are encouraged to consult regularly with their Dissertation Committee members during the planning, conducting and writing of the dissertation. Following the approval of the dissertation proposal students are required to maintain continuous enrollment (fall and spring semesters) for dissertation study until work is completed. Continuous enrollment begins on the date the Graduate School approves the student's dissertation topic. Students who exceed the required number of hours for degree completion will register for CSLG 8999 for three credits each semester until degree requirements have been completed.

Financial Aid/Financial Assistance

There is financial aid available in the form of grants and tuition waivers. The exact amount of funds available for any given year varies.

Program Certifications/Accreditation(s)

The program has been accredited by the Council for the Accreditation of Counseling and Related Education Programs (CACREP).

MASTER OF ARTS IN COUNSELING

The M.A. program in Counseling is accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP) in both school counseling and community counseling. Both specializations qualify graduates to become Licensed Professional Counselors in North Carolina and for certification eligibility by the National Board of Certified Counselors. The school counseling specialization qualifies graduates for advanced-level K-12 school counseling licensure in North Carolina.

Program Objectives

As prospective professional counselors, graduates of the program are prepared to: counsel clients, both individually and in groups, on educational, career, life planning, social, emotional, physical, spiritual, and organizational concerns; provide information to clients for educational, social, career, and/or life planning; consult with other professionals concerning client needs; and conduct needs assessments, evaluations, and other activities for program design.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the criteria for admission to the M.A. program in Counseling include an applicant's potential success in forming effective interpersonal relationships in individual and small-group contexts; aptitude for graduate-level study; vocational goals and objectives; openness to self-examination; and potential for personal and professional self-development. Admission decisions are based on applicants' individual profiles and made by a committee of program faculty. Applicants with the highest profile rankings are invited to campus for an interview process; the number invited is determined by the number of anticipated openings in the program. Students are admitted to the program in the spring of each year, and they are expected to begin their studies the following summer or fall. The application deadline for each year's admissions process is November 15.

Prerequisite Requirements

Students are not required to have an undergraduate major in any particular field to enter the counseling program.

Degree Requirements

The M.A. program in Counseling requires a total of 60 hours of core courses for all students and specialization courses for students in either *school counseling* or *community counseling*. Both specializations include a series of required courses, clinical experience courses and elective courses.

Admission to Candidacy

In addition to meeting Graduate School academic regulations, counseling students should submit a completed Application for Admission to Candidacy when they submit their application for the program's capstone experience to the Department of Counseling, Special Education, and Child Development.

Core courses for All Students (33 credits):

CHFD 6102 Learning and Development
Or
 EDUC 6100 Learning and Development
 RSCH 6101 Educational Research Methods
 RSCH 6109 Assessment and Evaluation Methods
 CSLG 6100 Counseling Theories
 CSLG 6101 Ethics in Counseling
 CSLG 6110 Counseling Techniques
 CSLG 6111 Advanced Techniques
 CSLG 6120 Group Counseling
 CSLG 6121 Structured Groups
 CSLG 6145 Multicultural Counseling
 CSLG 6150 Career and Lifestyle Development

School specializations courses (27 credits):

Required (9 credits):

CSLG 7141 School Counseling
 CSLG 7646 Administration and Leadership of School Counseling Services
 Elective from other Department in College (e.g., Special Education course)

Clinical experiences (two of three must be in a school setting) (9 credits):

CSLG 7430 Practicum in Counseling (150 hrs)
 CSLG 7435 Internship (300 hrs)
 CSLG 7435 Advanced Internship (300 hrs)

Elective Courses (9 hours). These courses must be approved by the student's advisor.

Community Specialization courses (27 credits):

Required (6 credits):

CSLG 7170 Community Counseling and Management
 PSYC 6153 Classification of Psychological Dysfunctions

Clinical experiences (two of three should be in a community setting) (12 credits):

CSLG 7430 Practicum in Counseling (150 hrs)
 CSLG 7435 Internship (300 hrs)

CSLG 7435 Advanced Internship (300 hrs)

Elective Courses (12 hours). These courses must be approved by the student's advisor.

Comprehensive Exam or Master's Project

Students must successfully complete either a written comprehensive examination or a master's project near the end of their program of study. Students are expected to consult with their advisors during the first 24 hours of course work concerning procedures and preparation for this experience.

Advising

All students should plan their program of study by December of their first year of study with their advisors.

Licensure

Students who graduate from the school counseling track are eligible, upon passing the exam required by the North Carolina Department of Public Instruction (DPI), to be recommended for school counseling licensure from the North Carolina DPI. All graduates are eligible to apply for the credential of Licensed Professional Counselor through the NCBLPC.

Program Certifications/Accreditation(s)

The school and community tracks are accredited by the Council for the Accreditation of Counseling and Related Education Programs (CACREP).

GRADUATE CERTIFICATE IN PLAY THERAPY

Program Description

A curriculum has been established for a specialty in play therapy. Students must complete four of the following courses:

- 1) CSLG 7142 Introduction to Play Therapy
- 2) CSLG 7143 Filial Therapy
- 3) CSLG 7144 Theory and Practice of Play Therapy
- 4) CSLG 6000 Special Topics in Play Therapy
- 5) CSGL 6200 Introduction to Theories of Family Counseling
- 6) CSLG 7435 Internship in Counseling (for students who are currently enrolled in the counseling program) **or** CSLG 7430 Practicum in Counseling and Guidance (with permission of Graduate Certificate Coordinator)

Applications for admission to the Graduate Certificate program are due by October 1 for spring enrollment and by April 1 for summer enrollment. Students are admitted to the Graduate School in a special category for certificate students.

Additional Admission Requirements

- 1) A master's degree in counseling, social work, or psychology from an accredited university or a current student admitted to the Department of Counseling
- 2) Online application to Graduate Admissions accompanied by the application fee in effect.
- 3) GPA required for entry into a master's degree program
- 4) Official transcripts
- 5) Personal statement of interest

GRADUATE CERTIFICATE IN SUBSTANCE ABUSE COUNSELING

Program Description

A curriculum has been established for a specialty in substance abuse counseling. Students must complete the following three courses: CSLG 6160/8160: Theories of Chemical Dependence; CSLG 6161/8161: Chemical Dependence: Assessment and Diagnosis; CSLG 6162/8162: Chemical Dependence: Counseling Individuals, Families, and Groups. Additionally, students must select one course from either CSLG 6163/8163: Chemical Dependence: Treatment Planning and Relapse Prevention or CSLG 6000: The McLeod Institute on Substance Abuse. These four courses plus 600 hours of supervised field experiences in substance abuse treatment facilities are components of a university-approved certificate program. . Students who successfully complete the four courses along with the 600 hours of field experience as a part of their master's degree in counseling at UNCC are eligible to apply for licensure under Criteria C with the North Carolina Substance Abuse Professional Practice Board. Applications for admission to the Certificate Program will be considered as they are received and admissions will be ongoing. Students are admitted to the Graduate School in a special category for certificate students.

Additional Admission Requirements

The certificate program admits practitioners and students who either hold or are currently enrolled in a CACREP-accredited graduate degree program. In addition to the general requirements for admission to a certificate program, applicants must provide official transcripts, three letters of recommendation from persons familiar with the applicant's personal and professional qualifications, and an essay describing the applicant's relevant experience and objectives in undertaking the certificate program in substance abuse counseling.

Financial Assistance

Financial assistance is available on a limited basis for students enrolled in the Substance Abuse Certificate Program. Contact the Department of Counseling for information on scholarship application.

POST-MASTER'S CERTIFICATE IN SCHOOL COUNSELING

The post-master's certificate in school counseling provides graduate level course work related to school counseling. Successful completion of the program requirements will enable the counselor to be recommended for licensure in school counseling from the North Carolina Department of Public Instruction. A minimum of twelve credit hours is required for the post-master's graduate certificate. All course work applied to a certificate must be completed within four years. Transfer credit is not accepted into the certificate program. Candidates wishing to start in the **summer** must submit their application by the first week of January to the Graduate School. Candidates wishing to start in the **fall** must submit their application to the Graduate School by the first week of May.

Program Description

This program has been designed for counselors who want to become eligible for licensure as school counselors by the Department of Public Instruction in North Carolina. The completion of this program, in addition to passing the PRAXIS II Specialty Area Test for School Counselors, will qualify students to become licensed School Counselors. Requirements for completion of the program are: CSLG 7141. The School Counselor (1st Summer/Fall), CLSG 7646. Administration and Leadership of School Counseling Services (Fall/Spring), CSLG 7436. Advanced Internship (School-based Clinical) (Fall/Spring), and a School-focused Elective (Fall/Spring/or Summer). An additional Internship may be required should the student need further clinical training. Any additional course work will be based on an individual review of each applicant's graduate transcript(s) and selected program option.

Additional Admission Requirements

- 1) A master's degree in counseling from an accredited university
- 2) Written application to Graduate Admissions accompanied by the application fee in effect
- 3) A Statement of Purpose
- 4) Letter(s) of Recommendation
- 5) Official transcripts (undergraduate/graduate)

Program Options

OPTION A*: For counselors who graduated from a 60 credit CACREP accredited program.

Program Requirements:

Based on a review of the applicant's transcript, a program of study will be designed that indicates the counselor has completed the following courses:

- CSLG 7141 The School Counselor (3)
- CSLG 7646 Administration and Leadership of School Counseling Services (3)
- CSLG 7436 School-based Internship (3)
- An additional school-focused elective (3)

OPTION B*: For counselors who graduated from CACREP accredited programs with less than 60 credits.

Program Requirements:

Based on a review of applicant's transcript, a program of study will be designed that is equivalent to a 60 credit school counseling program, including the following courses:

- CSLG 7141 The School Counselor (3)
- CSLG 7646 Administration and Leadership of School Counseling Services (3)
- CSLG 7436 School-based Internship (3)
- An additional school-focused elective (3)

OPTION C:** For counselors who graduated from non-accredited programs.

Program Requirements:

Based on a review of applicant's transcript, a program of study will be designed that is equivalent to a 48 credit school counseling program, including the following courses:

- CSLG 7141 The School Counselor (3)
- CSLG 7646 Administration and Leadership of School Counseling Services (3)
- CSLG 7436 School-based Internship (3)
- An additional school-focused elective (3)

* Upon successful completion of Option A or B and a passing score on the PRAXIS II test, a candidate will be eligible for CAS-level Licensure in School Counseling.

** Candidates successfully completing Option C and passing the PRAXIS II test will be eligible for M-level Licensure.

Additional Program Requirements & Information

In addition to completing required courses, students must pass the PRAXIS II Specialty Area Test for School Counseling to qualify for state licensure. Registration and information are available at www.ets.org.

Upon completion of all course work and passing the PRAXIS II, candidates must submit an Application for the Graduate Certificate at the start of their last semester. Candidates must also make application for their school counseling license a month prior to program completion in the TEAL Office, COED 119.

NOTE: The certificate program is now available **online** through Distance Education **only** for those applicants who qualify for CAS-level licensure [options A & B]. **Contact:** 704-687-3008 or visit www.distanceed.uncc.edu.

COURSES IN COUNSELING

CSLG 6000. Topics in Counseling. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit for different topics. (*Fall, Spring, Summer*)

CSLG 6100. Counseling Theories. (3) Examination of the counseling relationship from various theoretical frameworks, including client-centered, psychoanalytic, Gestalt, transactional analysis, rational emotive, reality, and behavior theories. (*Fall, Summer*)

CSLG 6101. Ethical and Professional Issues In Counseling. (3) Ethical and legal responsibilities, ethical standards, interpretations of laws by local authorities, and court decisions that impact the counseling profession. Skills of practical, ethical, and legal consultation are also emphasized. (*Fall, Summer*)

CSLG 6109. Research in Counseling. (3) Examination of principles and practices for research and development of programs in counseling with emphasis on developmental designs, preventive programs, objectives and organizations. (*On demand*)

CSLG 6110. Counseling Techniques. (3) Examination of concepts of individual counseling and the means for establishing facilitative relationships including competence in basic counseling skills and interventions. (*Fall, Spring*)

CSLG 6111. Advanced Counseling Techniques. (3) Prerequisites: CSLG 6100 and 6110. Counseling interventions useful in facilitating client change and growth from an action-oriented, problem management perspective. Strategies for cognitive, affective, and behavioral change will be practiced. (*Fall, Spring, Summer*)

CSLG 6115. Person-to-Person Relationships. (3) Examination of concepts and methods for improving human relationships. This course has an experiential component. (*On demand*)

CSLG 6120. Group Counseling. (3) Investigation of concepts of group counseling and the means for developing facilitative interaction in groups which will include an experiential component as a major learning activity. (*Fall, Spring*)

CSLG 6121. The Leadership and Design of Structured Groups. (3) Methods of creating psychoeducational groups. Focus on applying psychological theories to the selection of group content. Leadership issues such as screening, dealing with difficult members, and leader roles are addressed. (*Fall, Spring*)

CSLG 6145. Multicultural Counseling. (3) Approaches to counseling that focus on multicultural differences so the counselor will be more effective in dealing with clients from a variety of cultural backgrounds. (*Spring, Summer*)

CSLG 6150. Career and Lifestyle Development. (3) A counseling-oriented course designed to help the counselor and/or career education teacher develop the ability to use career information with emphasis on understanding of occupational information, systems of collection and usage forms. (*Spring, Summer*)

CSLG 6152. Approaches to Career Development (K-12). (3) Counselors and vocational development coordinators gain an understanding and skills necessary for (1) the development, management and evaluation of a comprehensive, competency-based K-12 career education/counseling program, (2) infusing career education into K-12 curriculum in a counselor/consultant capacity, and (3) establishing and leading successful individual and group career development activities. (*On demand*)

CSLG 6153. Diagnosis and Treatment in Counseling. (3) Prerequisite: Graduate status in MA program in Counseling. Focus is on development of diagnostic skills using the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)* multi-axial classification system for mental and emotional disorders. The course provides an overview of theory, research, and practice related to diagnosis and treatment. Diagnostic criteria will be studied with a sensitivity to cultural and ethnic issues. (*Spring, Summer*)

CSLG 6160. Theories of Chemical Dependence. (3). Introduction to the theoretical, philosophical, and historical premises upon which chemical dependence is explained and treatment and prevention are based. Biological, psychological, and sociological etiologies of substance abuse and dependence are studied. (*Alternate Fall, Even years*)

CSLG 6161. Assessment and Diagnosis of Chemical Dependency. (3) Process and procedures for professional biopsychosocial assessment and diagnosis of substance abuse and dependence in adolescents and adults are studied. Implications of chemical dependence for clients and their families are addressed. (*Alternate Spring, Odd years*)

CSLG 6162. Chemical Dependency: Counseling Individuals, Families, and Groups. (3) A counseling techniques course designed to help students who have worked as professional substance abuse counselors and those who have little or no experience working with substance dependent individuals and their families. (*Alternate Fall, Odd years*)

CSLG 6163. Chemical Dependency: Treatment Planning and Relapse Prevention. (3) An introduction to the principles and practices upon which chemical dependence treatment and relapse prevention are based. Computerized programs will be used to aid students in assessment, diagnosis, and in planning treatment for chemically dependent clients (*Alternate Spring, Even years*)

CSLG 6200. Introduction to Theories of Family Counseling. (3) Examination of appropriate interventions in working with families focusing on major theorists and techniques in the field. (*Spring*)

CSLG 6201. Counseling Needs of Women. (3) Women's development and needs, the problems they bring to

counselors, strategies for helping with them, myths about women and biases in psychological research. (*On demand*)

CSLG 6800. Individual Study in Counseling. (1-6) Prerequisite: Permission of the student's adviser. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. (*Fall, Spring, Summer*)

CSLG 7110. Individual Assessment. (3) Prerequisite: RSCH 6109 or PSYC 4140. Examination of the major aptitude, intelligence and other psychological tests commonly used in counseling with emphasis on test theory as well as the administration, scoring and interpretation of tests and the communication of their results. (*On demand*)

CSLG 7120. Administration and Supervision of Counseling Services. (3) Planning, operation, implementation and supervision of counseling and guidance services in schools and agencies with emphasis on the development of administrative and supervisory skills. (*On demand*)

CSLG 7140. Elementary School Counseling and Guidance. (3) Introduction to the guidance function in the elementary school with emphasis on the counselor's role in counseling, consulting and coordinating school and community resources for the optimum benefit of the child. (*On demand*)

CSLG 7141. The School Counselor. (3) Development of functional skills necessary for integration of counseling activities into the school curriculum. Focus on the role of the counselor in counseling individuals, small group counseling, classroom guidance, consultation, program design, coordinating school and community resources, and administration of special programs. (*Fall*)

CSLG 7142. Introduction to Play Therapy. (3) Enhancing the counseling relationship with children by using play media to establish facilitative relationships with children under the age of ten years. (*Spring, Summer*)

CSLG 7143. Filial Therapy. (3) Prerequisite: CSLG 7142. This advanced level play therapy course focuses on concepts and skills for training parents/caretakers/teachers to be therapeutic agents in their children's lives through the utilization of child centered play therapy skills in regularly scheduled structured play sessions with children. (*Alternate Fall*)

CSLG 7144. Theory and Practice of Play Therapy. (3) Prerequisite: CSLG 7142. An advanced exploration of fundamental issues involved in play therapy, this seminar course will focus on an in-depth study of various theoretical approaches, modalities, techniques, and applications of play therapy. Historical and theoretical foundations of play therapy are presented as are current issues in providing appropriate counseling services to children aged three to ten years old. (*Alternate Fall*)

CSLG 7151. Approaches to Adult Career Development. (3) Prerequisite: CSLG 6150. For the career development specialist who needs to survey an environment in which adults are seeking career counseling; assess needs; develop interventions strategies to meet needs; and assess outcomes. (*On demand*)

CSLG 7153. Research Techniques and Computer Applications in Career Counseling. (3) Prerequisites: RSCH 6101, 6109 and 6110. Skills in preparing a literature review upon which to base a research study; critiquing theoretical, philosophical, and research material and reports; and conducting and reporting a research study. Focus on understanding the effective application of computer technology to the provision of career-related services in mental health, education, rehabilitative or other human services settings. (*On demand*)

CSLG 7160. Solution-Focused Brief Therapy. (3) Prerequisites: CSLG 6110; CSLG 6100; CSLG 7430. An introduction to counseling in a time-limited manner while helping clients understand how they maintain their problems and how to construct solutions. (*Summer*)

CSLG 7170. Community Counseling and Management. (3) Counseling in community agency settings, including the roles and functions of a professional counselor, assessing the needs of an agency population and the interworkings of various agencies and agency networks. (*Fall*)

CSLG 7190. Introduction to Pastoral Counseling. (3) Prerequisites: CSLG 6100, 6110. Introduction to the field of pastoral counseling including both theological and counseling dimensions. (*On demand*)

CSLG 7191. Advanced Issues in Pastoral Counseling. (3) Prerequisite: CSLG 7190. Specific content relevant to pastoral counseling including didactic and experiential foci. (*On demand*)

CSLG 7205. Techniques of Family Counseling. (3) Prerequisites: CSLG 6100, 6200. An overview of techniques used by family counselors working from communications, structural or strategic orientations. (*On demand*)

CSLG 7430. Practicum in Counseling and Guidance. (3) Prerequisites: CSLG 6100, 6101, 6110, and 7142 if working in an elementary school setting. Supervision of individual and group counseling interventions conducted in field settings; special attention to the development of evaluative criteria for self and peer assessment. A minimum of 10 hours per week in field placement. Offered on a pass/no credit basis. May be repeated once for credit with departmental approval. (*Fall, Spring*)

CSLG 7435. Internship in Counseling. (3) Prerequisite: CSLG 7430 and 7142 if working in an elementary school setting. Students will participate in delivering counseling services in a field setting and receive supervision of their

work in weekly seminars. A minimum of 20 hours per week in field placement. Offered on a pass/no credit basis. May be repeated for credit. (*Fall, Spring*)

CSLG 7436. Advanced Internship. (3) Prerequisite: CSLG 7435. Continuation of CSLG 7435. Students will function as counselors in field settings and have the opportunity to demonstrate advanced level skills in weekly seminars. A minimum of 20 hours per week in field placement. (*Fall, Spring*)

CSLG 7600. Sexual Orientation Diversity in Clinical Practice. (3) The course considers the experience of being gay, lesbian, bisexual or transgendered in our society. Theoretical understandings of sexual orientation are covered, as well as the impact of societal prejudice on gay, lesbian, bisexual and transgendered individuals and their communities. The experience of diversity with such communities is discussed, especially racial/ethnic diversity. Exploration of individual values combines with an emphasis on clinical practice to make this course relevant both personally and professionally. (*Spring*)

CSLG 7601. Counseling: The Spiritual Dimension. (3) This course is designed to assist counselors in understanding and facilitating the development of their personal spirituality as well as the spirituality of others with whom they provide counseling services. Spirituality is viewed as an important component to achieving mental health and to a balanced sense of wellness. Basic beliefs and various spiritual systems including major world religions will be examined (*Spring*)

CSLG 7645. Cognitive-Behavior Theory and Practice. (3) An introduction to the theory and practice of cognitive-behavior therapy that can be applied in the school setting. The major theories (cognitive therapy, cognitive behavior modification, REBT, and reality therapy) will be examined, and treatment planning and application of techniques will be studied. (*Summer*)

CSLG 7646. Administration and Leadership of School Counseling Services. (3) This course will focus on the organization, planning, management, and evaluation of school counseling programs. Current issues impacting school counselors will be explored and intervention strategies will be examined. (*Spring*)

CSLG 7680. Crisis Counseling. (3) This course will focus on a general crisis intervention model and its application to specific crisis situations. Topics include: suicide intervention, rape crisis, telephone counseling, and disaster intervention. (*Summer*)

CSLG 7681. Grief and Loss Counseling. (3) This course examines the theory of loss, the tasks involved in grieving, and the skills needed by a counselor working with grief and loss issues. Loss will be examined from a broad perspective and includes issues associated with death, loss of relationships, and loss of abilities. (*Fall*)

CSLG 7800. Individual Study in Counseling. (1-6)

Prerequisite of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. (*Fall, Spring, Summer*)

CSLG 7999. Master's Degree Graduate Residency Credit.

(1) Meets Graduate School requirement for continuous enrollment during completion of capstone project or comprehensive examination. (*Fall, Spring, Summer*)

CSLG 8000. Topics in Counseling. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit for different topics. (*Fall, Spring, Summer*)

CSLG 8100. Advanced Counseling Theory Seminar. (3) The principles and practices of traditional and more current counseling theories are studied. Students will examine the rationale and consequences of their pre-conceived notions about conditions that influence human behavior and change. Students will develop their own theory of counseling. (*Fall*)

CSLG 8105. Seminar in Research in Counseling. (3) This course focuses on exploring the outcome research in counseling and career development, as well as the variables that influence the counseling process. Special focus will be on developing areas of personal expertise, developing research theses, and writing critical literature reviews. (*On demand*)

CSLG 8110. Clinical Supervision in Counseling. (3) This course provides a critical overview of the conceptual and empirical literature on counseling supervision, including models, approaches/techniques, relationship and process issues, and ethical and legal considerations. Students will develop conceptual knowledge, skills, and self-awareness concerning these topic areas through readings, seminar discussions, and application via supervising master's level students. (*Spring*)

CSLG 8111. Solution-Focused Brief Therapy. (3)

Prerequisites: CSLG 6110, CSLG 6100, CSLG 7430. An introduction to counseling in a time-limited manner while helping clients understand how they maintain their problems and how to construct solutions. (*Summer*)

CSLG 8142. Introduction to Play Therapy. (3) Enhancing the counseling relationship with children by using play media to establish facilitative relationships with children under the age of ten years. (*Spring, Summer*)

CSLG 8143. Filial Therapy. (3) Prerequisite: CSLG 7142. This advanced level play therapy course focuses on concepts and skills for training parents/caretakers/teachers to be therapeutic agents in their children's lives through the utilization of child centered play therapy skills in regularly scheduled structured play sessions with children. (*Alternate Fall*)

CSLG 8144. Theory and Practice of Play Therapy. (3)

Prerequisite: CSLG 7142. An advanced exploration of fundamental issues involved in play therapy, this seminar course will focus on an in-depth study of various theoretical approaches, modalities, techniques, and applications of play therapy. Historical and theoretical foundations of play therapy are presented as are current issues in providing appropriate counseling services to children aged three to ten years old. (*Alternate Fall*)

CSLG 8153. Diagnosis and Treatment in Counseling. (3)

Graduate status in Ph.D. program in Counseling. Focus is on development of diagnostic skills using the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)* multi-axial classification system for mental and emotional disorders. The course provides an overview of theory, research, and practice related to diagnosis and treatment. Diagnostic criteria will be studied with a sensitivity to cultural and ethnic issues. (*Spring, Summer*)

CSLG 8160. Theories of Chemical Dependence. (3).

Introduction to the theoretical, philosophical, and historical premises upon which chemical dependence is explained and treatment and prevention are based. Biological, psychological, and sociological etiologies of substance abuse and dependence are studied. (*Alternate Fall, Even years*)

CSLG 8161. Assessment and Diagnosis of Chemical Dependency. (3)

Process and procedures for professional biopsychosocial assessment and diagnosis of substance abuse and dependence in adolescents and adults are studied. Implications of chemical dependence for clients and their families are addressed. (*Alternate Spring, Odd years*)

CSLG 8162. Chemical Dependency: Counseling Individuals, Families, and Groups. (3)

A counseling techniques course designed to help students who have worked as professional substance abuse counselors and those who have little or no experience working with substance dependent individuals and their families. (*Alternate Fall, Odd years*)

CSLG 8163. Chemical Dependency: Treatment Planning and Relapse Prevention. (3)

An introduction to the principles and practices upon which chemical dependence treatment and relapse prevention are based. Computerized programs will be used to aid students in assessment, diagnosis, and in planning treatment for chemically dependent clients (3) (*Alternate Spring, Even years*)

CSLG 8200. Introduction to Theories of Family Counseling. (3)

Examination of appropriate interventions in working with families focusing on major theorists and techniques in the field. (*Spring*)

CSLG 8201. Counseling Needs of Women. (3)

Women's development and needs, the problems they bring to counselors, strategies for helping with them, myths about women and biases in psychological research. (*On demand*)

CSLG 8203. Instructional Theory in Counselor Education. (3) This course will prepare the student to become a professor in counselor education. An examination of the theories and methods of teaching in higher education will be explored. Readings from professional journals, lecture, discussion, and practical application in the classroom will be used to meet course objectives. *(Summer)*

CSLG 8345. Advanced Multicultural Counseling. (3) An advanced exploration of fundamental issues involved in culturally competent counseling, this seminar course will focus on an in-depth study of various cultures seeking counseling services. Students will examine various oppression models and have an opportunity to apply them to cultures in our community. *(Fall)*

CSLG 8346. Applied Multicultural Counseling. (3) This course focuses on the impact of oppression on the daily lives of marginalized groups. Students conduct extensive field-based investigations into various cultures in order to gain mastery-level knowledge of the practical day-to-day experiences especially as they involve accessing mental health services. Special focus will be on counseling applications that are appropriate within and between cultures. Learning to utilize systems interventions and the mastering of the skills of consultation are key components of this course. *(Spring)*

CSLG 8410. Practicum in Clinical Supervision. (3) This course will provide students with the practical experiences necessary to provide individual supervision of counselors, including field supervision and analyses of counseling audio and videotapes. Students will have the opportunity to test their conceptual knowledge, skill, and self-awareness developed through prerequisite coursework. Offered on a pass/no credit basis. *(Spring)*

CSLG 8431. Doctoral Practicum in Counseling. (3) Practicum is an applied course where students will develop and/or refine their counseling skills. These skills will be conceptually linked counselor education and supervision. Working in sites throughout the community, students will produce audio and/or video tapes of individual and group counseling practice for supervision. Offered on a pass/no credit basis. *(Spring)*

CSLG 8440. Internship I. (3) Student will deliver counseling services in a field setting and receive individual and group supervision of their work weekly. A minimum of 300 clock hours is required. Offered on a pass/no credit basis. *(Fall, Spring)*

CSLG 8445. Internship II. (3) Students will participate in 300 hours internship experience in field settings that are appropriate to their career objectives under the supervision of a University program faculty member. Offered on a pass/no credit basis. *(Fall, Spring)*

CSLG 8600. Sexual Orientation Diversity in Clinical Practice. (3) The course considers the experience of being gay, lesbian, bisexual or transgendered in our society. Theoretical understandings of sexual orientation are covered, as well as the impact of societal prejudice on gay, lesbian, bisexual and transgendered individuals and their communities. The experience of diversity with such communities is discussed, especially racial/ethnic diversity. Exploration of individual values combines with an emphasis on clinical practice to make this course relevant both personally and professionally. *(On demand)*

CSLG 8601. Counseling: The Spiritual Dimension. (3) This course is designed to assist counselors in understanding and facilitating the development of their personal spirituality as well as the spirituality of others with whom they provide counseling services. Spirituality is viewed as an important component to achieving mental health and to a balanced sense of wellness. Basic beliefs and various spiritual systems including major world religions will be examined. *(On demand)*

CSLG 8604. Counseling Sexual Minority Families and Couples. (3) This course will focus on the unique challenges facing the counselor who is providing clinical services to gay, lesbian, bisexual and transgendered families and couples. Topics include the impact of oppression on primary relationships, the political implications of sexual minority relationships, relationship models, parenting, and interacting with the outside world. *(On demand)*

CSLG 8645. Cognitive-Behavior Theory and Practice. (3) An introduction to the theory and practice of cognitive-behavior therapy that can be applied in the school setting. The major theories (cognitive therapy, cognitive behavior modification, REBT, and reality therapy) will be examined, and treatment planning and application of techniques will be studied. *(On demand)*

CSLG 8646. Administration and Leadership of School Counseling Services. (3) This course will focus on the organization, planning, management, and evaluation of school counseling programs. Current issues impacting school counselors will be explored and intervention strategies will be examined. *(Fall, Spring)*

CSLG 8680. Crisis Counseling. (3) This course will focus on a general crisis intervention model and its application to specific crisis situations. Topics include: suicide intervention, rape crisis, telephone counseling, and disaster intervention. *(Summer)*

CSLG 8681. Grief and Loss Counseling. (3) This course examines the theory of loss, the tasks involved in grieving, and the skills needed by a counselor working with grief and loss issues. Loss will be examined from a broad perspective and includes issues associated with death, loss of relationships, and loss of abilities. *(Fall)*

CSLG 8800. Individual Study in Counseling. (1-6)
Prerequisite of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. Offered on a pass/no credit basis. (*Fall, Spring, Summer*)

CSLG 8998. Seminar in Prospectus Design. (3) This course will provide students the opportunity to identify and define a research area of inquiry and develop a proposal draft for the dissertation study. Students will be expected to select, plan and outline an original research study appropriate for the dissertation requirement. (*Fall*)

CSLG 8999. Dissertation. (3-9) Under the direction of a dissertation advisor and committee, the student is expected to design and execute an original research study. This study should address a significant issue or problem related to counseling or counselor education. Offered on a pass/no credit basis. (*Fall, Spring, Summer*)

CSLG 9999. Doctoral Degree Graduate Residency Credit.
(1) Meets Graduate School requirement for continuous enrollment. (*Fall, Spring, Summer*)

Curriculum and Instruction

- **Ph.D. in Curriculum and Instruction**

Dept of Middle, Secondary & K-12 Education
324 College of Education
704-687-8875
<http://education.uncc.edu/mdsk/programs/Ph.D>

Coordinator

Dr. Jeanneine P. Jones

PH.D. IN CURRICULUM AND INSTRUCTION

The Ph.D. in Curriculum and Instruction is designed to prepare teacher education faculty and other educational professionals for work in various agency and educational settings. The program is interdisciplinary and involves faculty from across the university campus, and primarily the Departments of English; Mathematics; Middle, Secondary, & K-12 Education; and Reading and Elementary Education. The program focuses on urban issues and perspectives related to curriculum and instruction with specializations in (1) urban education, (2) literacy education (oriented toward reading education, English education, or

Teaching English as a Second Language), (3) mathematics education, and (4) elementary education. Studies include a substantive core in urban education and educational research. Students may focus their study on education for learners at elementary, middle grades, secondary, K-12, or post-secondary/adult levels.

Curriculum Objectives

- 1) Lead inquiry into the nature of curriculum theory and the relationship that theory has upon the major sources, components, and processes required in curriculum development, particularly within expanding urban-regional environments.
- 2) Demonstrate relationships among curriculum theory and design, models of and research about teaching and learning, variations among learners, and the ideological, social, and disciplinary contexts of teaching and learning, including the influence on urban-regional schools, state and national policies, curriculum philosophy, and political pressures.
- 3) Guide curriculum development and evaluation in its pragmatic context by applying curriculum theory, policy, and practice for diverse learners within a variety of educational settings.

Research and Evaluation Objectives

- 1) Use appropriate quantitative and qualitative research methods to solve problems in urban education and related disciplines, detect new patterns, and assess the effectiveness of instructional programs and teaching methodologies for all learners.
- 2) Communicate research and evaluation findings in a variety of written and electronic formats, such as evaluation reports, professional articles, grant proposals, conference presentations, and technical reports, with the consistent underlying purpose of supporting educational effectiveness and reform in urban-regional environments.

Specialty Objectives

- 1) Apply theory and research in one's area of specialization to detecting new patterns, identifying problems, and solving urban-regional problems of curriculum, teaching, learning, and assessment through collaborative problem identification, research projects, policy formation, and professional development.
- 2) Exhibit sustained intellectual curiosity, broad understandings, specialized knowledge, and professional commitments pertaining to one's selected area of specialization within the context of urban-regional schools.

Additional Admission Requirements

Applicants should submit a current vitae and a professional writing sample. A review committee will conduct an initial review of application materials and recommend selected applicants for on-campus interviews. The selection committee will then make final recommendations to the Graduate School relative to acceptance into the program

based on the merits of the application materials and the interview process.

Prerequisite Requirements

The intended audience for the Ph.D. in Curriculum and Instruction includes education professionals who hold the master's degree. It is anticipated that most applicants will be experienced teachers or school leaders with the North Carolina "G" or "M" license or equivalent licenses from other states. However, the program will welcome and accommodate non-licensed candidates with appropriate professional experiences who have been involved in teaching or educational program development and evaluation.

Degree Requirements

The Ph.D. in Curriculum and Instruction requires a minimum of 60 semester hours of coursework, including the dissertation. A student must maintain a cumulative average of 3.0 in all coursework taken. An accumulation of more than two C grades will result in termination of the student's enrollment in the graduate program. If a student makes a grade of U in any course, enrollment in the program will be terminated. The program will consider the transfer of a limited number of courses from an accredited institution (typically no more than six hours), providing the Curriculum and Instruction Committee determines that the course or courses to be transferred are appropriate for the program of study and are graduate-level courses beyond the master's degree. The grade in these transfer courses must be an A or B. All dissertation work must be completed at UNC Charlotte. Students must successfully complete requirements for the comprehensive examination and dissertation. All students must complete a residency requirement of at least 18 credit hours over three successive terms of enrollment. Students must complete their degree, including dissertation, within eight years. The PhD website (<http://education.uncc.edu/mdsk/programs/Ph.D/>) contains additional information, including updated planning sheets for each strand.

Advising

An advisor will be assigned to each student within the first year of study. The advisor and the strand coordinator will provide initial advising until the end of the first year (12 hours) when the advisor will assume responsibility. By the beginning of the second year the student is required to submit a Program of Study which is approved by the advisor and the strand and program coordinators. Advisors will also support the student in identifying faculty whose research interests and expertise are congruent with the student's probable area of dissertation inquiry. The assistance of the Advisor does not relieve the student of responsibility for completing required work and for following departmental or university procedures. In the semester in which the student takes the Comprehensive Examination, the student will reach agreement with a faculty member to serve as dissertation chair. The chair must be a member of the Curriculum & Instruction faculty.

Admission to Candidacy Requirements

Students are considered candidates for the doctoral degree upon: (a) successful completion of the Comprehensive Examination, (b) approval of the Dissertation Proposal, and (c) submission of the Application for Candidacy form. Both the Petition for Topic Approval and the Application for Candidacy should be submitted together. Candidacy must be achieved at least six months before the degree is conferred.

Application for Degree

Students must submit an Application for Degree in the semester in which they successfully defend their dissertation proposal. Adherence to Graduate School deadlines and requirements is expected. Degree requirements are completed with the successful defense of the dissertation and when the final copy of the dissertation has been filed in the Graduate School.

Strands

Each of the available strands offers a variety of courses at the doctoral level. See the PhD website at <http://education.uncc.edu/mdsk/programs/Ph.D> for the program's student handbook and program planning sheets. These documents include a complete list of courses and requirements by program and strand.

COURSES IN CURRICULUM AND INSTRUCTION

EDCI 8004. Topics in Analysis. (3) Cross-listed as MATH 6004. May be repeated for credit as topics vary.

EDCI 8008. Topics in Geometry and Topology. (3) Cross-listed as MATH 6008. May be repeated for credit as topics vary.

EDCI 8020. Topics in English Education. (3) Examination of special topics germane to English education in urban-regional environments at the elementary, middle, and secondary school levels as well as the community and four-year college, including historical perspectives on current problems, effectiveness of programs and practices in urban schools, and emerging theories on teaching and learning. Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit topics vary. (*On demand*)

EDCI 8040. Topics in Reading Education. (3) Cross-listed as READ 6000. Examination of special topics germane to reading education in urban-regional environments at the elementary, middle, and secondary school levels as well as the community and four-year college, including historical perspectives on current problems, effectiveness of programs and practices in urban schools, and emerging theories of learning. Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit as topics vary. (*On demand*)

EDCI 8070. Topics in Urban Educational Research. (3) Examination of the research in specific areas germane to urban educational settings and problems. Emphasis on different research questions and methodologies used to investigate similar problems. Examination of alignment of research findings with educational change in urban environments of the elementary, middle, and secondary school levels as well as the community and four-year college. May be repeated for credit as topics vary. (*On demand*)

EDCI 8070. Topics in Urban Educational Leadership. (3) Examination of special topics germane to leadership in urban education environments at the elementary, middle, and secondary school levels as well as the community and four-year college. Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit as topics vary. (*On demand*)

EDCI 8075. Topics in Urban-Regional Education. (3) Examination of special topics germane to education in urban-regional environments at the elementary, middle, and secondary school levels as well as the community and four-year college. Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit as topics vary. (*On demand*)

EDCI 8100. Foundations of Mathematics. (3) Cross-listed as MATH 6100.

EDCI 8101. Foundations of Real Analysis. (3) Cross-listed as MATH 6101.

EDCI 8102. Calculus from an Advanced Standpoint. (3) Cross-listed as MATH 6102.

EDCI 8103. Computer Techniques and Numerical Methods. (3) Cross-listed as MATH 6103.

EDCI 8105. Problem-Solving in Discrete Mathematics. (3) Cross-listed as MATH 6105.

EDCI 8106. Modern Algebra. (3) Cross-listed as MATH 6106.

EDCI 8107. Linear Algebra. (3) Cross-listed as MATH 6107.

EDCI 8112. Theoretical Foundations of Learning Mathematics. (3) Introductions to theories of learning that have influenced the teaching of mathematics in K-12. An overview of theories that have guided reforms in mathematics teaching; contemporary constructivist theories of mathematics learning. (*Alternate years*)

EDCI 8113. Research in Mathematics Education. (3) An introduction and overview of research in the teaching and learning of mathematics in K-12. Overview of contemporary research perspectives and paradigms; interpreting and synthesizing the research literature; survey

of contemporary research problems in mathematics teaching and learning; development of classroom-based research studies. (*Alternate years*)

EDCI 8114. Advanced Topics in Mathematics Education. (3) Prerequisite: Enrollment in the Mathematics Education specialization of the Doctoral Program in Curriculum and Instruction. Advanced research topics in the teaching and learning of mathematics. Includes a survey, interpretation, and synthesis of contemporary research problems in mathematics teaching and learning. May be repeated for credit as topics vary. (*On demand*)

EDCI 8115. Issues in the Teaching of Secondary School Mathematics. (3) Prerequisite: Students must be enrolled in the Master of Arts in Mathematics Education Program. Study of major issues affecting secondary mathematics education: analysis of the impact of learning theories on methods of teaching; assessment methods for improving mathematics learning; analysis of the historical and programmatic development of the secondary school mathematics curriculum leading to current trends, issues, and problems; and analysis of the role of technology in the secondary mathematics classroom. (*Alternate years*)

EDCI 8118. Non-Euclidean Geometry. (3) Cross-listed as MATH 6118.

EDCI 8120. Literacy and Educational Public Policy. (3) Examination of competing definitions of literacy and development of literacy practices related to debates in American education public policy about the ends of schooling, the strategies of teaching, and the priorities of the language arts curricula. Evaluation of assumptions, reasoning, and research bases linking literacy to policy. Study of the historical and current methods of establishing district, statewide and federal policies about literacy education programs, materials, personnel, grants, and licensure. (*On demand*)

EDCI 8121. Applied Research Methods in the Teaching of English. (3) Cross-listed as ENGL 6674.

EDCI 8129. Linguistics and Language Learning. (3) Cross-listed as ENGL 8263.

EDCI 8131. Research in English Studies. (3) Cross-listed as ENGL 6101.

EDCI 8132. Research in Literary Theory. (3) Cross-listed as ENGL 6102.

EDCI 8133. Multiculturalism and Children's Literature. (3) Cross-listed as ENGL 6104.

EDCI 8134. Early Black American Literature. (3) Cross-listed as ENGL 6147.

EDCI 8135. African American Literary Theory and Criticism. (3) Cross-listed as ENGL 6158.

EDCI 8137. Language and Culture. (3) Cross-listed as ENGL 6165.

EDCI 8138. Comparative Language Study. (3) Cross-listed as ENGL 6166.

EDCI 8139. Perspectives in African-American Literature. (3) Cross-listed as ENGL 6147.

EDCI 8140. Current Issues and Practices in Literacy Education. (3) Cross-listed as READ 6100.

EDCI 8152. Varieties of Constructivism in Elementary Education. (3) Examines Piaget's constructivism and various strands of constructivism that have arisen in the latter half of the 20th century. (*Alternate years*)

EDCI 8153. Pro-seminar in Elementary Education. (3) Introduces candidates to elementary education faculty and their research programs to allow doctoral students to connect early in their program with faculty who will chair or serve on their committees. (*Fall*)

EDCI 8154. History of Education in America. (3) In-depth study of the philosophic and historical events influencing the development of the contemporary school. Literature related to trends in curriculum, instruction, social justice, and school configuration will be emphasized. (*Spring*)

EDCI 8155. Using Process and Outcome Data to Drive Continuous School Improvement. (3) Prerequisite: RSCH 8110. Consideration and study of how successful elementary schools collect and use data to drive their reform activities, with a focus on providing culturally and individually responsive instructional programs. (*Alternate years*)

EDCI 8156. Critical Issues in Elementary School Professional Development and Teacher Learning. (3) Foundations of professional development, opportunities for teacher learning to improve practices in curriculum development, instructional leadership, and classroom management, and an understanding of the influence of socially responsive professional development in urban elementary schools. (*Alternate years*)

EDCI 8157. Analysis of Inquiry Teaching and Learning in Elementary Schools. (3) Prerequisite: RSCH 8111. Focus on topics associated with inquiry teaching and learning in an elementary school setting including historical background; underlying theoretical and philosophical frameworks; models of inquiry instruction; and curricular implications. (*Alternate years*)

EDCI 8180. Critical Issues and Perspectives in Urban Education. (3) This course provides an introduction to some of the current critical issues in urban education. Topics include: structural inequality, immigration, poverty,

(re)segregation, the impact of race, class, ethnicity, gender and language, as well as *No Child Left Behind*. In this course, these topics and other issues will be examined from critical, historical, socio-cultural, and political perspectives. This is an intensive reading and writing course that also requires participation in school and/or community activities to better understand the urban environment. (*Fall*)

EDCI 8182. Power, Privilege and Education. (3) This course addresses the critical interconnections of race, class, gender, sexuality and power and privilege in education and beyond. It investigates how these intersections influence individual and group level outcomes. The course decodes issues of power and privilege in schools and society, and explores how this awareness can help create an entirely new social landscape. (*Fall*)

EDCI 8183. Teaching English as a Second Language. (3) Cross-listed as TESL 6103.

EDCI 8184. Social Theory and Education. (3) This course provides an overview of classical and contemporary developments and debates in social theory, as well as their influences in educational research. It emphasizes the principles and processes of theory development and the application of theory in research. The course seeks to enhance understanding of theoretical models and analyses and how they form social lens for the examination of school processes. (*Spring*)

EDCI 8186. Globalization, Urbanization, and Urban Schools. This course explores globalization locally and internationally, with special emphasis on how global development processes are affecting urban communities and urban schools. The course explores issues of global governance, global inequality, low-wage economics, and the transnationalization of the globe. It investigates conceptual and theoretical issues underlying globalization, and their impacts on the production of knowledge, educational policy, and school curricula. (*Fall, Every other year*)

EDCI 8250. Applied Research in Literacy Education (3) Cross-listed as READ 6250. Introduction to the research interests of faculty, with emphasis on research in urban educational issues and problems. Seminar and individual support for replication attempts, instrument development and field-testing in pilot studies, practice in and critique of different methods of data-gathering and data analysis. (*On demand*)

EDCI 8252. K-12 Writing Development and Instruction. (3) Cross-listed as READ 6252.

EDCI 8254. Collaborative Leadership in Literacy Education. (3) Cross-listed as READ 6474.

EDCI 8255. Middle/Secondary Reading and Writing. (3) Cross-listed as READ 6255.

EDCI 8256. Diagnostic Assessment and Instruction in Reading. (3) Cross-listed as READ 6260.

EDCI 8300. Social Stratification and Urban Schools and Communities. (3) Prerequisite: EDCI 8184. This course investigates social stratification in schools and society. It uses school-society integration framework to explore socially reproducing aspects of the social and economic systems. Through examination of current and past patterns of social organizations and power structures, it produces knowledge about education and mobility opportunities. The course emphasizes the socioeconomic implications of school stratification and how this impacts students' life chances. *(Fall or Spring)*

EDCI 8310. Transformative Black Education. (3) This course is designed to engage students in an in-depth study of the philosophical, psychological, cultural and historical bases for Black education and the theoretical perspectives underlying a transformative approach to the education of students of African descent in America. The issues covered will include the education debt, resilience, psychological effects of racism, education in the Diaspora, African-centered education, culturally nurturing curriculum and pedagogy, and African students in America. *(Fall)*

EDCI 8311. Critical Readings in Urban Education Research. (3) Prerequisites: RSCH 8111 and RSCH 8121. This course is designed to further students' understanding and practice of Urban Education research studies conducted primarily through qualitative research. The methods presented and the studies covered will be of particular importance to anyone conducting qualitative research in urban schools and communities. One critical component of this course is the study of a variety of standpoints and anti-racist methodologies in Urban Education. *(Upon sufficient enrollment)*

EDCI 8312. Urban Schooling, Curriculum, and Pedagogy. (3) At the heart of 'Urban Schooling' are curriculum and pedagogy. This course explores the literature on successful teachers, principals, and educational reformers who have developed curriculum and/or pedagogy that have proven effective in urban schools. It critically examines current practices such as managed curriculum and teaching to the test in urban classrooms and proposes education for democracy, that is culturally relevant and emancipatory. *(Spring)*

EDCI 8314. Urban Educational Reform. (3) This course will explore the educational reform movements since 1954, the landmark Brown v. Board of Education Supreme Court case. The major focus will be on the current federal legislation, No Child Left Behind, as well as state and local reform as they impact urban schooling.

EDCI 8320. Social Deviance, Delinquency and Education. (3) This course critically examines social deviance and delinquency and their influence on education and beyond. It examines how violence against children is

sustained through public policies and social structures and institutions. It explores contemporary forms of deviance, and how they affect student outcomes. Particular consideration is given to the causes of crime, as well as the punishment and treatment of offenders. In addition, special attention is given to deterrence and crime prevention. *(Spring or Summer)*

EDCI 8330. History of Urbanization and Its Impact on Schooling. (3) This course focuses on a historical contextualization of urban developments and their impacts on schools. It examines the American educational system as it relates to politics, economic, cultural practices and public policies. The course explores the shift in the American educational system from rural to urban schools, and it investigates how urbanization shaped schools and created the framework for current issues in urban schools. The course concludes with an analysis of urbanization in Charlotte, North Carolina and how Charlotte schools have been impacted. *(Fall or Spring, every other year)*

EDCI 8420. Writing Program Administration and Supervision. (3) Study of and supervised experiences in the development, administration, supervision, and evaluation of writing programs in urban educational settings. Students may focus on programs at the elementary, middle, or secondary schools or within community and four-year colleges. Emphasis on program development that supports writers from diverse backgrounds. *(On demand)*

EDCI 8460. Internship in Urban Education. (3) Prerequisite: Permission of instructor. Internship experiences planned and guided cooperatively by University and school personnel. *(On demand)*

EDCI 8462. Supervision of Student Teachers. (3) Concentrated practice in the supervision of student teachers with emphasis on support of student teachers in urban schools. Internship experience with direct faculty supervision in seminars and school settings. *(Spring, odd years)*

EDCI 8609. Seminar. (3) Cross-listed as MATH 6609.

EDCI 8610. Readings in Mathematics Education. (3) Prerequisites: Enrollment in the Mathematics Education specialization of the Doctoral Program in Curriculum and Instruction. Readings in the teaching and learning of mathematics K-16; analysis of the historical development of the K-16 mathematics curriculum leading to current trends, issues, and problems; theory, methods, and techniques for assessment; and analysis of contemporary issues impacting the teaching of mathematics. *(On demand)*

EDCI 8640. Readings in Literacy Research. (3) Study of methodology and findings of historical and current research about needs and characteristics of diverse literacy learners in urban-regional environments, successful programs and policies, and promising solutions to educational challenges

confronting literacy teachers and literacy learners. (*On demand*)

EDCI 8650. Critical Readings in Elementary Education Research. (3) Critical review, analysis, and synthesis of current and historical literature having special significance for elementary education, with specific focus on research related to educational theory and practice and their implications for teaching at the elementary level. (*Alternate years*)

EDCI 8660. Readings in Urban Educational Research. (3) Study of methodology and findings of historical and current research about needs and characteristics of urban schools, diverse populations in urban-regional environments, legal and ethical issues, policy-making, and promising solutions to educational challenges of poverty, social justice, language differences, and conflicting values. (*On demand*)

EDCI 8681. Seminar in College Teaching. (3) Issues, theories, and research about teaching late adolescent and adult learners. Limited opportunities for supervised teaching experiences with faculty who support students as they teach or co-teach undergraduate courses. (*On demand*)

EDCI 8682. Seminar in Professional and Grant Writing. (3) Introduces the forms of professional and grant writing expected of education professionals. Emphasis on writing for publication and writing for federal and state funding. Collaborative writing and peer assessment will be part of the process. (*On demand*)

EDCI 8699. Dissertation Proposal Seminar. (3) Prerequisite: Permission of Program Coordinator, Strand Coordinator, or Advisor. Identification of a research question and development of the proposal for an original research study appropriate for the dissertation requirement. May be repeated for credit. (*Fall, Spring*)

EDCI 8840. Independent Study in Reading, Language, and Literacy. (3) Cross-listed as READ 6800. Prerequisite: Permission of the student's advisor. Independent study of a literacy education problem or issue under the supervision of an appropriate faculty member. May be repeated for credit. (*Fall, Spring, Summer*)

EDCI 8850. Independent Study in Elementary Education. (3) Prerequisite: Permission of the student's advisor. Independent study of an elementary education problem or issue under the supervision of an appropriate faculty member. May be repeated for credit. (*On demand*)

EDCI 8880. Independent Study in Urban Education. (3) Prerequisite: Permission of the student's advisor. Independent study of an urban education problem or issue under the supervision of an appropriate faculty member. May be repeated for credit. (*Fall, Spring, Summer*)

EDCI 8999. Dissertation Research. (3) Prerequisite: Committee approval of the dissertation proposal. Execution

of original research study that addresses the solution to an urban educational problem in curriculum, teaching, learning, or leadership. Graded on a Pass/No Credit basis. May be repeated for credit. (*Fall, Spring, Summer*)

EDCI 9999. Doctoral Degree Graduate Residency Credit. (1) (*Fall, Spring, Summer*)

Curriculum and Supervision

- M.Ed. in Curriculum and Supervision
- Graduate Certificate in Curriculum and Supervision

Department of Educational Leadership

261 College of Education
704-687-8856
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Graduate Faculty

Corey Lock, Professor
Michael Jazzar, Assistant Professor
James Lyons, Professor
J. Allen Queen, Professor
Wayne White, Assistant Professor

MASTER OF EDUCATION IN CURRICULUM AND SUPERVISION

The M.Ed. in Curriculum and Supervision is designed to prepare highly competent program leaders for the school systems of North Carolina. UNC Charlotte is particularly dedicated to serving the 23 school districts located in the Southwestern Piedmont area of the state. To achieve its objectives, the program is designed to attract high-quality students and help them develop specific competencies to enable them to define, communicate, interpret, and assess teachers in the implementation of state and local curricula.

Program Objectives

The major educational objectives of the program are to develop instructional leaders who have advanced knowledge and skills in curriculum development and supervisory practices to assist the school system by:

- 1) Guiding principals and teachers in the interpretation of curriculum standards and specific competencies for instructional development.
- 2) Directing teachers in curriculum and instructional alignment to maximize success for the highest levels of student achievement possible.
- 3) Promoting the expectations that effective teachers are masters of their subject content, highly knowledgeable of human dynamics, directly responsive to individual differences in students and are well accomplished in the art and science of pedagogy and student assessment.
- 4) Encouraging participants in the program to self-direct their personal and professional growth as educators by:
 - a) Taking responsibility for their own learning;
 - b) Initiating professional inquiry through conversations with colleagues;
 - c) Critically reading the professional literature;
 - d) Participating voluntarily in personal and professional development opportunities; and
 - e) Setting high expectations for their professional performance.
- 5) Guiding participants to promote in teachers the skills to respond effectively to children's differences as influenced by development, exceptionalities, and diversity by:
 - a) Developing and advanced understanding of human development;
 - b) Expecting and respecting differences among children that are influenced by development, exceptionalities, and diversity;
 - c) Promoting understanding and respect for all members of the classroom community;
 - d) Helping students, parents, and colleagues develop a global perspective; and
 - e) Applying their knowledge at all levels of interaction with students: from modifying instruction for individuals to creating classroom environments where all students feel welcome and can be successful learners.
- 6) Demonstrating advanced knowledge of the content and pedagogy in curriculum and supervision by:
 - a) Demonstrating advanced knowledge of the range of appropriate content;
 - b) Helping children to acquire the knowledge and skills appropriate for specific grade levels and development through many effective instructional and assessment practices;
 - c) Using technology in a variety of ways to support learning;
 - d) Helping students develop competencies applicable across the curriculum; and
 - e) Helping children make sense of their learning by connecting school content and students' lives outside of school and by integrating curriculum.
- 7) Improving educational practice through self-reflection, self-evaluation, and applied research by:
 - a) Engaging in study that leads to continuous improvement of teaching and learning;
 - b) Actively investigating and solving educational problems through data gathering and assessment;
 - c) Continuously monitoring the learning problems and successes of each learner;
 - d) Making appropriate adjustments in both instruction and learning environments based on analysis of data; and
 - e) Regularly monitoring the effects of their actions on academic achievement.
- 8) Serving as educational leaders by:
 - a) Actively participating as leaders in areas in which they can contribute to solving educational problems, such as School Advisory Teams and committees in professional organizations;
 - b) Taking responsibility for sharing in decision-making relative to school-wide and/or system-wide issues;
 - c) Readily asking for and sharing successful instructional approaches and solutions with colleagues, supervisors, and educational leaders; and
 - d) Providing mentoring for colleagues.

The Program

Today, curriculum specialists and instructional supervisors must be able to elicit support and create program structures and climates that foster the kinds of creativity, change, and innovation that will educate the most diversified group of children ever in America's schools. To meet this challenge, the M.Ed. program focuses on curriculum development. It enables candidates to develop specific competencies related to curriculum leadership, instructional practice and supervisory roles. It emphasizes performance and competence in school-based leadership and the overall quality of K-12 instruction.

The M.Ed. program provides for 33 credits of classroom study followed by an internship. In the cohort, a part-time student can complete the program in two years. Students average two courses per semester while the final six credit hours of each student's program are in the internship and a seminar. The internship semester is undertaken on a full-time basis (typically during the summer term just prior to graduation). The program faculty will work with students and school districts to arrange for the internships to be completed with minimum impact on their current positions.

General Curriculum Plan

The 39 semester-hour M.Ed. program includes nine hours of professional education core courses and 30 hours of course work in curriculum and educational administration and leadership (including academic experience in internships and seminars).

Professional Education Core Courses (9)

EIST 6101 The Adult Learner

RSCH 6101 Educational Research Methods

CUSU 6100 Fundamentals of Educational Leadership

Core Courses in Educational Administration and Leadership (21)

- CUSU 6122 Foundations of Curriculum Theory and Development
- CUSU 6123 Designs in Curriculum Practices
- CUSU 6105 Legal Aspects of Schooling
- EIST 5000 Instructional Technology
- CUSU 6130 Supervision of Instruction
- RSCH 6196 Program Evaluation Methods
- An elective or ADMN 6120 Instructional Leadership

Internship/Seminars (9)

- CUSU 6601 Seminar in Curriculum and Supervision
- CUSU 6491 Internship and Seminar: Curriculum and Supervision

Additional Admissions Requirements

In order to be considered for admission to the M.Ed. program, applicants are expected to submit the following materials to the Graduate Admissions Office:

- 1) A completed online application
- 2) Evidence of a bachelor's degree or its equivalent from an accredited institution with an overall GPA of at least 3.0
- 3) One official transcript of previous academic work attempted beyond high school
- 4) A score of 50th percentile or higher on the Graduate Record Examination or the Miller Analogies test taken within the previous five years
- 5) Three professional recommendations, including one from the applicant's immediate supervisor
- 6) A description of previous relevant employment, including evidence of at least two years of successful teaching experience in K-12
- 7) Evidence of a clear "A" level license
- 8) Applicant must be a full time teacher
- 9) A personal statement of purpose or intent for entering the program

Applications to the program will be accepted by October 1 for admission the following spring semester. The October 1 deadline requires a complete admissions packet. The application process is designed to ensure selection of a highly competent and diverse cohort of students. The number admitted each year will be based on current resources, but it is expected to be approximately 20 students. Upon successful completion of the program and Praxis examination, graduates will receive a recommendation for North Carolina licensure as a Curriculum-Instructional Specialist (licensure area 113 Level I).

POST-MASTER'S GRADUATE CERTIFICATE IN CURRICULUM AND SUPERVISION

Educators who hold a master's degree in an educational area and who possess an "M" level teaching certificate can apply for the 21 semester hour Advance Certificate in Curriculum and Supervision. The Advance Certificate leads to state licensure as an Instructional Specialist (licensure area 113 Level I).

The Advance Certificate program provides for 15 credits of classroom study followed by an internship. Students average one course per semester with an internship in the final semester. The internship semester is undertaken on a full-time basis. The program faculty will try to work with students and school districts to arrange for the internships to be completed with minimum impact on their current positions.

General Curriculum Plan

- CUSU 6100 Fundamentals of Educational Leadership
- CUSU 6122 Foundations of Curriculum Theory and Development
- CUSU 6123 Designs in Curriculum Practices
- CUSU 6130 Supervision of Instruction
- CUSU 6601 Seminar in Curriculum and Supervision
- CUSU 6491 Internship and Seminar: Curriculum and Supervision (6 hrs)

Additional Admissions Requirements

In order to be considered for admission to the Advance Certificate program, applicants are expected to submit the following materials to the Graduate Admissions Office:

- 3) A completed online application
- 4) Evidence of a master's degree in education or its equivalent from an accredited institution with an overall GPA of at least 3.5
- 5) One official transcript of previous academic work attempted beyond the bachelor's degree
- 6) Three professional recommendations, including one from the applicant's immediate supervisor
- 7) A description of previous relevant employment, including evidence of at least three years of successful teaching experience in K-12
- 8) Evidence of a clear "M" level license
- 9) Applicant must be a full time educator
- 10) A personal statement of purpose or intent for entering the program

Applications to the program will be accepted until November for admission the following spring semester. The November 1 deadline requires a complete admissions packet. This process is designed to ensure selection of a highly competent and diverse group of students. The number admitted each year will be based on current resources. Upon

successful completion of the program and Praxis examination, completers will receive a recommendation for North Carolina licensure as a Curriculum-Instructional Specialist, licensure area 113 level I.

COURSES IN CURRICULUM AND SUPERVISION

CUSU 6000. Topics in Curriculum and Supervision. (1-6) May include classroom and/or clinical experiences in the content area. With departmental approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

CUSU 6100. Fundamentals of Educational Leadership. (3) The developing role of educational organizations in the United States and the societal and cultural influences that affect the delivery of schooling. Structure and organization of American schools, administrative and organizational theory, legal, moral, and ethical dimensions of schooling within the context of restructuring and reform. *(Spring)*

CUSU 6105. Legal Aspects of Schooling. (3) Education law for education professionals which focuses on the legal rights and responsibilities of students, teachers, and administrators and how these legal provisions affect educational policy and practice. *(Fall)*

CUSU 6122. Foundations of Curriculum Theory and Development. (3) Foundations of historical curriculum development, philosophic beliefs, and understanding of the development of the American public school system. *(Summer)*

CUSU 6123. Designs in Curriculum Practices. (3) Examines the field of curriculum with particular emphasis on the change process. *(Summer)*

CUSU 6130. Supervision of Instruction. (3) Introduction to clinical supervision and development of skills in classroom observation, analysis, evaluation, and assistance. Systems of observation, principles of adult development in school settings, techniques for conducting classroom observations and conferences, and development of staff development programs to remedy assessed weaknesses. *(Fall)*

CUSU 6491. Internship in Curriculum and Supervision. (6) Prerequisite: Department approval. Internship under the supervision of University and on-site personnel in a setting consistent with the student's professional goals in which the student will be involved in the diverse activities expected of the professional administrator. *(Summer)*

CUSU 6601. Seminar in Curriculum and Supervision. (3) Capstone class in curricular and supervisory leadership. Exploration of seminal topics and preparation for the internship. *(Spring)*

CUSU 6800. Independent Study in Curriculum and Supervision. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

CUSU 7999. Master's Degree Graduate Residency Credit. (1) Meets Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive examination. *(Fall, Spring, Summer)*

CUSU 8000. Topics in Curriculum and Supervision. (1-6) May include classroom and/or clinical experiences in the content area. Requires departmental approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

CUSU 8126. National and International Developments in the Community College. (3) Prerequisite: admission to the doctoral program in Educational Leadership or Curriculum and Instruction and advisor approval. Doctoral seminar study that compares international issues and developments in the community college in other countries with those of the United States. Topics include historical development of junior/community college, the role of the community college in different cultures, types of programs offered, and trends for the future. There will also be opportunity for students to pursue individual areas of interest. *(Summer) (On demand)*

CUSU 8127. Comparative Higher Education. (3) Prerequisite: admission to the doctoral program in Educational Leadership or Curriculum and Instruction and advisor approval. Doctoral seminar study that compares international issues and developments in higher education in other countries with those in the United States. Topics include historical development of the university, purpose of the university in different cultures, current expectations for faculty and students, and trends for the future. There will also be opportunity for students to pursue individual areas of interest. *(Summer) (On demand)*

CUSU 8800. Independent Study in Curriculum and Supervision. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

CUSU 8999. Dissertation Research. (3) Prerequisite: Permission of the Ed.D. program coordinator. Execution of original research study that addresses the solution to an educational or school-related problem or that addresses a substantive curricular or supervisory leadership or programmatic issue. *(Fall, Spring, Summer)*

Educational Administration

- **Master of School Administration (MSA)**
- **Graduate Certificate in School Administration**

Department of Educational Leadership

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Corey Lock, Professor
Jim Lyons, Professor
Ann McColl, Associate Professor
J. Allen Queen, Professor
Rebecca Shore, Assistant Professor
Patricia Wilkins, Clinical Assistant Professor
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Jim Watson, Assistant Professor

MASTER OF SCHOOL ADMINISTRATION (MSA)

The mission of the Master of School Administration (M.S.A.) program is to prepare innovative, collaborative, effective, and reflective leaders who are prepared to develop school environments that ensure equitable and quality learning opportunities for a rapidly changing and increasingly diverse population and focus on improving the learning for ALL students. Program graduates qualify for a PreK-12, Level 1 School Administrator's license (Principal).

Program Objectives

Program objectives are aligned with the approved national standards of the Educational Leaders Constituent Consortium, the North Carolina Department of Public Instruction, the National Council for Accrediting Teacher Education, and The State Board of Education's Standards for School Executives. In particular there are six basic standards that serve as core curriculum components:

- 1) visioning for school improvement
- 2) creating a positive school culture, providing an effective instructional program, and designing comprehensive professional growth plans
- 3) managing the organization
- 4) collaborating with families and community, responding to diverse interests and needs
- 5) acting with integrity, fairly, and equitably
- 6) interacting and influencing the larger political, social, economic, legal, and cultural context

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, applicants must have a minimum of three years successful teaching experience, a Class A North Carolina teaching license or equivalent, an acceptable GRE or MAT test score, a statement of purpose, a complete resume showing evidence of leadership, a copy of the teacher license, and recommendations from school administrators who can attest to your potential success as a school principal. Absolute application deadline is January 15 for applicants applying to the North Carolina Principal Fellows Program. Application deadline is January 15(primary) and April 15(secondary) for enrollment in the MSA program and the Graduate Certificate in School Administration program. Enrollment in all programs begins in the fall semester.

Admission decisions are based on an analysis of applicant profiles made by program faculty and clinical instructors. Applicants with the highest profile rankings are invited to participate in interviews. Program faculty, clinical faculty, acting principals/assistant principals, and student interns serve on interview teams. These interviews are designed to provide the applicant an opportunity to show evidence of academic strengths, leadership potential, and personal characteristics. After the interview, the applicant will provide a writing sample from a given prompt.

The Master of School Administration Program faculty is committed to achieving diversity among the students admitted in each year's cohort group and will make admission decisions accordingly. The Graduate School will notify applicants of their admission status.

Degree Requirements

The M.S.A. program requires a total of 39 hours in a combination of courses in educational leadership, research, technology, curriculum, and instruction. All students must complete a ten-month, full-time internship under the direction of a principal-mentor and a university supervisor.

The internship challenges students to demonstrate a thorough and well-integrated understanding of the basic principles, research findings, and theories covered in their course work and apply these to educational practice and leadership situations.

Courses

- ADMN 6100 Fundamentals of Educational Leadership (3)
- ADMN 6105 Legal Aspects of Schooling (3)
- ADMN 6110 School Leadership & Management (3)
- ADMN 6120 Instructional Leadership (3)
- ADMN 6140 Curriculum Leadership (3)
- ADMN 6161 The Principalship (3)
- ADMN 6410 Internship and Seminar Part I (6)
- ADMN 6420 Internship and Seminar Part II (6)
- ADMN 6601 Seminar in Administration & Supervision (1) (1) (1)
- RSCH 6101 Educational Research Methods (3)
- EIST 5100 Computer Applications in Education (3)

Capstone Experiences

The 10-month internship requires the productive application of knowledge, skills, and dispositions, to the problems of practice. The experience provides a multitude of opportunities for the intern to progressively develop administrative competence. Interns are guided through their experience by their school-site mentor and university clinical supervisor.

Principal Fellows

Each year a limited number of scholarship/loans for persons seeking an M.S.A. as full-time students are available from the North Carolina Principal Fellows Program (www.ncpfp.org). The program is funded by the North Carolina General Assembly to help highly qualified persons study school administration on a full-time basis.

GRADUATE CERTIFICATE IN SCHOOL ADMINISTRATION

Students seeking to “add-on” the *Certificate in School Administration* to a previous master’s degree must complete 18 course credit hours of which a portion is a supervised 10-month internship. The sequence of courses for this program is:

- ADMN 6100 Fundamentals of Educational Leadership
- ADMN 6105 Legal Aspects of Schooling
- ADMN 6000 Topics in Educational Administration
- ADMN 6161 Principalship
- ADMN 6601 Seminar in Administration and Supervision
- ADMN 6410 Internship and Seminar Part I
- ADMN 6420 Internship and Seminar Part II

Admission Requirements

To be eligible and to apply for this program, applicants must:

- Hold a master’s degree from a regionally accredited institution
- Have a cumulative grade point average of at least 3.2 in all previously completed graduate degree coursework
- Have three years of successful teaching experience
- Submit a complete résumé
- Submit a valid NC teaching license or equivalent
- Submit three letters of reference from current or past supervisors that document leadership and administrative experiences and potential for success as a site-based school administrator
- Submit a 1-2 page personal statement that addresses professional experiences, future goals, and an understanding that school administrators must possess a comprehensive conceptual, pedagogical, and reflective knowledge base
- Follow all admission guidelines established by UNC Charlotte’s Graduate School

COURSES IN EDUCATIONAL ADMINISTRATION

ADMN 6000. Topics in Educational Administration. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit for different topics.

ADMN 6100. Fundamentals of Educational Leadership. (3) The developing role of educational organizations in the United States and the societal and cultural influences that affect the delivery of schooling. Structure and organization of American schools, administrative and organizational theory, legal, moral, and ethical dimensions of schooling within the context of restructuring and reform.

ADMN 6105. Legal Aspects of Schooling. (3) Education law for education professionals which focuses on the legal rights and responsibilities of students, teachers, and administrators and how these legal provisions affect educational policy and practice.

ADMN 6106. Legal Issues in Special Education. (3) Survey of federal and state statutory and administrative provisions governing the delivery of education and related services to exceptional students.

ADMN 6107. School Law for Counselors and Related Professionals. (3) Legal issues and problems of special relevance to school counselors, psychologists, social workers, and related professionals who work with school-age children.

ADMN 6110. School Leadership and Management. (3) Examination of school leadership and administration, focusing on the role, tasks, and responsibilities that accompany school-based leadership.

ADMN 6120. Instructional Leadership. (3) Examination of research-based teaching/learning models and the relationship between instructional decisions and curriculum experiences. Dynamics of group development and problems/practices related to providing instructional assistance to teachers.

ADMN 6130. Supervision of Instruction. (3) Introduction to clinical supervision and development of skills in classroom observation, analysis, evaluation, and assistance. Systems of observation, principles of adult development in school settings, techniques for conducting classroom observations and conferences, and development of staff development programs to remedy assessed weaknesses.

ADMN 6140. Curriculum Leadership. (3) Examination of internal and external influences on curriculum formation and development at the building level with emphasis on development of administrative strategies for curriculum decision-making which are driven by staff involvement.

ADMN 6161. The Principalship. (3) Examination of school administration focusing on the role, task and responsibilities associated with the principalship with special attention to the conceptual, human and technical skills associated with the principal.

ADMN 6166. Educational Leadership. (3) Examination of leadership in formal organizations and social and behavioral science research concerning leadership ability with emphasis on educational organizations and the role of the leader in the accomplishment of organizational goals.

ADMN 6410. Internship and Seminar Part I. (1-9) Full-time, academic year internship in educational administration designed to allow theoretical and course-based practical learning to be translated and interwoven into a supervised field-based experience.

ADMN 6420. Internship and Seminar Part II. (1-9) A continuation of the internship experiences and seminar begun in ADMN 6410.

ADMN 6490. Internship and Seminar: Administration. (3-6) Prerequisite: Department approval. Internship under the supervision of University and on-site personnel in a setting consistent with the student's professional goals in which the student will be involved in the diverse activities expected of the professional administrator. Seminars are held concurrently.

ADMN 6491. Internship and Seminar: Supervision. (3-6) Prerequisite: Permission of the department. Internship under the supervision of University and on-site personnel in a setting consistent with the student's professional goals in which the student will be involved in the diverse activities expected of the curriculum-instructional specialist. Seminars are held concurrently.

ADMN 6601. Seminar in Administration and Supervision. (1-3) Prerequisite: Permission of the department. Examination of selected areas of interest in educational administration and supervision. May be repeated for credit.

ADMN 6800. Individual Study in Educational Administration. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit.

Educational Leadership

- **Ed.D. in Educational Leadership**

Department of Educational Leadership

261 College of Education

704-687-8730

<http://education.uncc.edu/coe/doctoral.htm>

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Ann McColl, Associate Professor

Grace Mitchell, Assistant Professor

J. Allen Queen, Professor

Chuang Wang, Assistant Professor

Wayne White, Assistant Professor

ED.D. IN EDUCATIONAL LEADERSHIP

The Ed.D. program in Educational Leadership is designed to prepare educational administrators who can assume mid-level and senior-level leadership positions in pre-collegiate educational or non-public school settings. The program includes two specializations, a school specialization and community specialization.

Program Objectives

Graduates of the program are prepared to:

- 1) Exhibit a broad understanding of their roles as educational leaders in the organizations they serve
- 2) Demonstrate leadership competencies and skills necessary to accomplish the goals of complex organizations
- 3) Interact successfully with the numerous institutions and interests that influence their organizations
- 4) Understand theoretical concepts that under gird organizational theory and behavior, leadership, social psychology, policy development, and organizational change
- 5) Address basic issues that face educational leaders, including resource acquisition and management, policy development and analysis, program management, personnel selection and evaluation, community relations and curriculum development

Note to Students in School Specialization: The Department of Educational Leadership follows the standards and guidelines of the ISLLC/ELCC for the school specialization. A complete copy of the standards and guidelines are available online at www.npbea.org/ELCC.

Ed.D. in Educational Leadership

School Specialization

Superintendent Focus and Curriculum/Supervision Focus

Overview

The program is designed to serve the needs those interested in the study of issues regarding the administration of PK-12 public and private educational institutions. These students pursue careers as superintendents and senior level administrators. In addition to the program requirements regarding leadership experiences, (see below), these prospective students must hold a Master of School Administration, Master of Education in Curriculum Supervision, Master of Education in Instructional Technology, or a comparable program. These students must already have a valid certificate in an appropriate field. Appropriate PK-12 North Carolina licensure will be recommended at graduation. A Superintendent Focus or Curriculum / Supervision Focus may be chosen by working with your advisor and selecting the courses and experiences required for the licensure selected.

The Ed.D. program consists of a minimum of 60 credit hours beyond the master's degree:

- 1) 15 semester hours in RSCH Prefix Courses:
RSCH 8210 Applied Educational Research
RSCH 8110 Descriptive/Inferential Statistics
RSCH 8120 Advanced Statistics
ADMN 8699 Proposal Development
One Research Elective Courses (Work with your advisor)
- 2) 33 semester hours of specialization coursework which includes one of the following areas of focus:

Educational Leadership/Superintendency; Curriculum Leadership and Instructional Supervision. See complete listing of courses for each focus

- 3) 6 semester hours of electives *
- 4) 6 semester hours of dissertation credits **

*Elective Courses: An elective course must be at the 8000 level and offered within the University. Permission of the department offering the course and approval by the student's advisor and doctoral coordinator is required.

**Students continue to enroll in dissertation study until the completion of the degree.

Ed.D. in Educational Leadership

Community Specialization

Overview

The mission of the Department of Educational Leadership is to prepare educators as leaders. This program within the department emphasizes leadership in the areas of curriculum development and instructional supervision in non public school settings. It is designed for those interested in careers as senior level administrators in educational organizations or for those whose professional responsibilities relate to the supervision of instruction in other contexts. To ensure the effectiveness and competence of individuals in such positions, coursework within the program also reflects the need for proficiency in program design, evaluation and research.

Prospective students should already have a Master's degree in an appropriate and related field. They are not required to hold N.C. PK-12 licensure nor will any license or certificate be recommended upon graduation.

This Ed.D. program consists of a minimum of 60 credit hours beyond the Master's degree in the following areas:

- 15 Semester Hours - Foundations Coursework*
- 39 Semester hours - Specialization Coursework
(including 15 semester hours in Education Research and Evaluation)**
- 6 Semester Hours - Dissertation Coursework***

*Suggested Foundations Coursework:

- ADMN 8160 Educational Leadership
- EIST 8101 Adult Learner
- ADMN 8121 Doctoral Seminar in Curriculum Design
- ADMN 8660 Instructional Leadership Seminar
- ADMN 8110 Organizational Theory and Behavior

**Elective courses must be at the 8000 level and offered within the University. Permission of the department offering the course and approval by the student's advisor and doctoral coordinator is required.

***Students continue to enroll in dissertation study until the completion of the degree.

School and Community Specializations Degree Requirements

School Specialization

Superintendent Focus

Foundations and Specialty: 33 Semester Hours

- ADMN 8610 Interdisciplinary Seminar
- ADMN 8160 Educational Leadership
- ADMN 8121 Doctoral Seminar in Curriculum Design
- ADMN 8140 Advanced School Finance
- ADMN 8130 Educational Government & Policy
- ADMN 8110 Organization Theory & Behavior
- ADMN 8120 Advanced School Law
- EIST 8101 The Adult Learner
- ADMN 8150 Human Resources & Development
- ADMN 8410 Adv Internship in Educational Leadership Part 1
- ADMN 8420 Adv Internship in Educational Leadership Part 2

Research: 15 Semester Hours

- RSCH 8210 Applied Educational Research
- RSCH 8110 Descriptive/Inferential Statistics
- RSCH 8120 Advanced Statistics
- ADMN 8699 Proposal Design
- Research Elective 3 Semester Hours

Dissertation 6 Semester Hours

- ADMN 8999 Dissertation**

Electives 6 Semester Hours *

*Elective Courses: An elective course must be at the 8000 level and offered within the University. Permission of the department offering the course and approval by the student's advisor and doctoral coordinator are required.

**Students continue to enroll in dissertation study (a minimum of 6 hours) until the completion of the degree.

School Specialization

Curriculum & Supervision Focus

Foundations and Specialty: 33 Semester Hours

- ADMN 8610 Interdisciplinary Seminar
- ADMN 8160 Educational Leadership
- ADMN 8121 Doctoral Seminar in Curriculum Design
- ADMN 8140 Advanced School Finance
- ADMN 8125 Doctoral Seminar in Instruction
- ADMN 8660 Instructional Leadership Seminar
- ADMN 8122 Advanced Curriculum Theory and Development
- ADMN 8120 Advanced School Law
- EIST 8101 The Adult Learner
- ADMN 8489 Practicum in Staff Development Specialization Elective 3 Semester Hours

Research 15: Semester Hours

- RSCH 8210 Applied Educational Research
- RSCH 8110 Descriptive/Inferential Statistics
- RSCH 8120 Advanced Statistics
- ADMN 8699 Proposal Design
- Research Elective 3 Semester Hours

Dissertation 6 Semester Hours

- ADMN 8999 Dissertation**

Electives 6 Semester Hours*

*Elective Courses: An elective course must be at the 8000 level and offered within the University. Permission of the department offering the course and approval by the student's advisor and doctoral coordinator are required.

**Students continue to enroll in dissertation study (a minimum of 6 hours) until the completion of the degree.

Community Specialization

Foundations and Specialty: 33 Semester Hours

- ADMN 8160 Educational Leadership
- EIST8101 The Adult Learner
- ADMN 8121 Doctoral Seminar in Curriculum Design
- ADMN 8660 Instructional Leadership Seminar
- ADMN 8110 Organizational Theory
- 18 Semester Hours of Specialty Coursework

Research 15: Semester Hours

- RSCH 8210 Applied Educational Research
- RSCH 8110 Descriptive/Inferential Statistics
- RSCH 8196 Program Evaluation
- ADMN 8699 Proposal Design
- Research Elective 3 Semester Hours

Dissertation 6 Semester Hours

- ADMN 8999 Dissertation**

Electives 6 Semester Hours *

*Elective Courses: An elective course must be at the 8000 level and offered within the University. Permission of the department offering the course and approval by the student's advisor and doctoral coordinator are required.

**Students continue to enroll in dissertation study (a minimum of 6 hours) until the completion of the degree.

Additional Admission Requirements

School Specialization

In addition to the general requirements for admission to the Graduate School, applicants must have a master's degree from an accredited institution. Candidates must have an entry-level license in educational administration or supervision; and they must have a minimum of three years of successful leadership experience, which may include the full-time internships. Applicants must also submit a personal essay of purpose; a description of their previous relevant employment, highlighting their leadership experiences in school-settings; and recommendations from school administrators and former university instructors.

Admission decisions are based on a comparison on of applicant profiles and are made by a departmental admissions committee that includes program faculty. Applicants with the highest profile rankings are invited to participate in interviews that are conducted by the Ed.D. Admissions Committee is designed to provide evidence of an applicant's academic strength, leadership potential, and personal characteristics. Admission decisions are based not only on the comparative profiles of all applicants, but also on the commitment of the Admissions Committee to achieve diversity among the students admitted in each year's cohort group. Admission decisions are made in the spring, with the expectation that admitted students will begin their course work in the summer.

Community Specialization

In addition to the general requirements for admission to the Graduate School, applicants must have a master's degree from an accredited institution. Applicants must have a minimum of three years of documented successful work related experience. They must also submit a personal essay. The applicant should provide a statement of purpose, description of previous relevant employment, and the nature of previous educational experiences in the essay. Recommendations from employers and former university instructors are required.

Admission decisions are competitive. These decisions are made by a departmental admissions committee that includes program faculty. Applicants with the highest profile rankings are invited to participate in interviews that are conducted by the Ed.D. Admissions Committee. The committee is designed to provide evidence of an applicant's academic strength, leadership potential, and personal characteristics. Decisions are based not only on the comparative profiles of all applicants, but also on the commitment of the Admissions Committee to achieve diversity among the students admitted each year. Admission decisions are made in the spring of each year.

Admission to Candidacy Requirements

Students are recommended for admission to candidacy after successfully completing the written and oral comprehensive examination.

Internships

All students (in the School Specialization) seeking licensure are required to complete an internship or practicum in a K-12 school district. The internship is based upon identified objectives and organizational areas within the school system of the internship assignment. Students are also required to complete a project based upon a current educational leadership topic related to student achievement.

Advising

Doctoral students will have the benefit of three phases of advising as they pursue their degree.

Phase 1: The doctoral coordinator will serve as the "temporary advisor" when students enter the program. During this phase, the advisor plans a course of study with students during the initial stages of the program. A Program Planning Sheet is used to document tentative plans for projected coursework. The planning sheet should be kept by the student and a copy should be provided to the advisor.

Phase 2: At the beginning of the second semester but no later than the end of the first year of the program, students will select a "program advisor" to serve as a guide through the completion of the coursework. This person will also serve as the coordinator of the process to complete the Qualifying Comprehensive Examinations. This advisor also helps the student identify faculty whose research interests and expertise are congruent with the student's probable area of inquiry for the dissertation. This advisor in consultation

of the student has the responsibility for creating a "doctoral committee" that will be made up of the faculty who will prepare and evaluate the written and oral comprehensive qualifying exam. (See Qualifying Comprehensive Examination section of the Handbook.)

The responsibility of the doctoral committee members includes:

- 1) the approval of the student's course of study
- 5) approval of the dissertation proposal and
- 6) evaluation of the final dissertation and oral defense.

Phase 3: Upon successful completion of the Qualifying Comprehensive Examinations, students are recommended for admission to candidacy. They may then select a "dissertation advisor" and a dissertation committee and complete a "Change of Advisor Form" if needed. These committee members are appointed to serve on the committee with mutual consent between the student and each faculty member. The committee consists of four members of the Graduate Faculty: the Chairperson and two other members from the Department and one member appointed by the Graduate School from outside the College of Education.

The purpose of this process is to provide students with an opportunity to develop a direct working relationship with several faculty members. At the same time, it provides an individualized and personalized approach to the advising process. For example, some students may choose to keep the same faculty member to serve as both the program advisor and the dissertation advisor. Likewise, the doctoral committee and the dissertation committee could include some or all of the same faculty.

Comprehensive Examination

Students are required to successfully pass a written and oral examination. The examination is based upon the core areas of the respective specializations.

Dissertation

Students must complete and defend a dissertation focused on a specific problem or question relevant to their specialization. Students must be continually enrolled in ADMN 8999 (3 hrs) (fall, summer and spring sessions) for dissertation research credit, beginning with the semester following completion of the comprehensive examination and continuing through the semester of their graduation. Defense of their dissertation is conducted in a final oral examination that is open to members of the University community.

Application for Degree

Students may submit an Application for Degree during the semester in which they successfully defend their dissertation proposal. Adherence to Graduate School deadlines is expected. Degree requirements are completed when a student successfully defends the dissertation and files the final copy of the dissertation in the Graduate School.

Program Certification/Accreditations

National Council for the Accreditation of Teacher Education (NCATE)
North Carolina Department of Public Instruction (NCDPI)

COURSES IN EDUCATIONAL LEADERSHIP**Doctoral Students Only**

ADMN 8000. Topics in Educational Leadership. (1-6)
Requires departmental approval may be repeated for credit for different topics. (*Fall, Spring, Summer*)

ADMN 8110. Organizational Theory and Behavior. (3)
Prerequisite: Admission to Ed.D. program in Educational Leadership. Analysis of the structure and organization of public education in the United States in terms of organizational theory and historical development. Consideration of organizational change theory, organizational development, and the planning process. (*Fall*)

ADMN 8120. Advanced School Law. (3) Prerequisite: ADMN 6105 or 6107 or permission of the instructor. Current policy issues, including educational finance, testing/grouping, desegregation/integration, and the provision of public educational services to private-school students. (*Spring*)

ADMN 8121. Doctoral Seminar in Curriculum Design. (3) Examination of principles and practices for educational leaders in program design, implementation and evaluation. (*Spring*)

ADMN 8122. Advanced Curriculum Theory & Development. (3) An examination of philosophic thought and its relationship to educational theories which have led to assumptions for educational practices in American schools. (*Fall*)

ADMN 8125. Doctoral Seminar in Instruction. (3)
Analysis of models of teaching and the match between attributes of the models and the instructional outcomes desired by the teacher. (*Summer*)

ADMN 8130. Educational Governance and Policy Studies. (3) Prerequisite: Admission to Ed.D. program in Educational Leadership. An examination of the institutional structure for policy-making in American education and the theories, models and practices that relate to policy-making in education. (*Summer*)

ADMN 8140. School Finance. (3) Prerequisite: Admission to Ed.D. program in Educational Leadership or permission of instructor. An examination of the theory and operation of public school finance systems and school business administration with special attention to local, state, and

federal sources of revenue and such business functions as budgeting and financing capital outlay projects. (*Summer*)

ADMN 8150. Human Resources Development and Administration. (3) Prerequisite: ADMN 8110 or initial licensure as school administrator. Examination of personnel administration in educational institutions, including administration of personnel at the school district level and its contribution to the overall management and operation of a school system. (*Fall*)

ADMN 8160. Introduction to Educational Administration. (3) Examination of behavioral components of administrative theory, organization, decision-making and planning for educational development including appraisal of significant functions, techniques, practices and problems as they relate to public school systems, social institutions, and the system of social and governmental agencies. (*Fall*)

ADMN 8170. Introduction to the Community College. (3) Prerequisites: Admission to a doctoral program and permission of the advisor and instructor. An overview of the two-year college with an emphasis on the comprehensive community college. Content will focus on the history and evolution of the community college including origin, culture, mission, structure, and governance. Special attention is paid to effective leadership and administration, finances, faculty, curriculum and instruction, student services and access, institutional effectiveness, community education, and economic development. (*On demand*)

ADMN 8410. Advanced Internship in Educational Leadership Part I. (3) Prerequisites: ADMN 8110, 8120, 8130, and 8140. Internship experiences planned and guided cooperatively by University and school personnel, including some work in private, community, or social service organizations. Accompanying cohort seminar for integrating and synthesizing knowledge and skills useful to practicing school leaders. (*Fall*)

ADMN 8420. Advanced Internship in Educational Leadership Part II. (3) Prerequisite: ADMN 8410. Continuation of ADMN 8410. (*Spring*)

ADMN 8439. Practicum in Adult Education. (3)
Prerequisites: EIST 8101 and admission to the doctoral program and permission of the advisor and instructor. The practicum in adult education will provide students with an opportunity to explore and expand an identified area of adult education that builds on professional and/or academic experiences previously engaged in or studied. The course will include a variety of activities and experiences developed by the student in consultation with the instructor. These will enable students to extend skills or develop new competencies as they work with adults in selected contexts in the community. This course may be taken no more than twice for three credit hours each time. (*Fall, Spring*)

ADMN 8489. Practicum in Staff Development. (3)
Examination of techniques of delivering in-service training

and development of leadership for in-service educational programs including design and implementation of a staff development program in a school setting. (*Spring*)

ADMN 8610. Interdisciplinary Seminar. (3) Prerequisite: Admission to Ed.D. program in Educational Leadership. Ideas, values, cultures, and contemporary issues affecting society generally and education particularly and principles and practices for responding to the publics with whom school leaders interact. May be repeated for credit. (*Summer*)

ADMN 8660. Instructional Leadership Seminar. (3) Prerequisite: EDUC 8122. Investigation and evaluation of current trends and issues in supervision as they relate to the role of the educational leader, with special attention to the role of facilitating the teaching/learning process. (*Summer*)

ADMN 8695. Advanced Seminar in Teaching and Learning. (3) Examination of a number of current teaching models to provide a framework for choosing those appropriate for a given classroom setting with special attention to the relationship between teaching strategies and learning outcomes. (*Spring*)

ADMN 8699. Dissertation Proposal Seminar. (3) Prerequisite: Completion of research requirements. Identification and definition of a research area and development of a proposal draft for an original research study appropriate for the dissertation requirement. (*Fall, and On demand*)

ADMN 8800. Individual Study in Educational Administration. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. (*Fall, Spring, Summer*)

ADMN 8999. Dissertation Research. (3) Prerequisite: Permission of Ed.D. program coordinator. Execution of original research study that addresses the solution to an educational or school-related problem or that addresses a substantive educational leadership or programmatic issue. (*Fall, Spring, Summer*)

EIST 8101. The Adult Learner. (3) The focus of this course will be on the examination of how adults learn in instructional settings. Characteristics of the adult learner will be examined. Students will investigate adult learning theory as well as current trends and advancements in adult learning. The focus will be on making better instructional decisions and media selection for the education and training of adults. (*Fall, Summer*)

Elementary Education

• Master of Education in Elementary Education (M.Ed.)

Department of Reading and Elementary Education

367 College of Education
704-687-8889

Coordinator

Dr. Jack Piel

MASTER OF EDUCATION IN ELEMENTARY EDUCATION

The master's (M.Ed.) program in Elementary Education is a K-6 instructional degree that leads to the "M" level teaching license. This 39-hour program promotes the following strands of competence:

1) Instructional Leader and Mentor

This degree program enables graduates to develop leadership/mentorship skills

2) Career Path for Teachers as Educational Leaders

Learn "best practices" for instructional tactics based on current research findings in education. Completion of this degree program will enable graduates to advance up the pay scale through a 10% salary increase.

3) National Board Certification Alignment

Completion of this program will assist graduates in the pursuit of National Board Certification.

Program Goals

Master teachers are self-directed in their personal and professional growth as educators.

Master teachers are responsive to children's differences influenced by development, exceptionalities, and diversity.

Master teachers are well-grounded in the content and pedagogy of the entire elementary curriculum.

Master teachers are self-reflective, self-evaluative, and educational researchers.

Master teachers are collaborative educational leaders.

Instructional Phases

This degree program is organized so that students will become instructional leaders through:

1) Phase I. Developing Perspectives

Thirteen (13) hours of Professional, Theoretical, and Research coursework applicable to elementary education.

This coursework establishes the basis for Phase II and Phase III.

2) Phase II. Content and Pedagogy

Sixteen (16) hours of coursework based on current research findings. Graduates will investigate and share effective instructional practices designed to improve learning in the classroom.

3) Phase III. Collaborative Leadership

Four (4) hour block of coursework developed to help students achieve the necessary skills to become instructional leaders and mentors within a public school setting.

Electives

Six (6) hour requirement selected from a variety of course offerings designed to allow teacher leaders to guide their own learning relative to goals and interests

Phase I. Developing Perspectives

Complete Phase I core requirements according to approved plan before beginning Phase II. Note Prerequisite for ELED 6220 (ELED 6101).

Requirements (13 hours)

- ELED 6101 Applications of Theories of Human Development and Learning (3)
- RSCH 6101 Educational Research Methods (3)
- ELED 6111 Critical Issues in Elementary Education (3)
- ELED 6220 Integrating the Elementary Program (3)
- ELED 6691A Seminar in Professional and Leadership Development (1)

Phase II: Content and Pedagogy

Complete requirements of Phase II according to your approved plan before Phase III.

Requirements (16 hours)

- EDUC 6254 Individualizing Instruction for Diverse Learners (3)
- ELED 6221 Teaching and Learning K-6 Science (3)
- ELED 6241 Teaching and Learning K-6 Social Studies (3)
- ELED 6252 Teaching and Learning K-6 Mathematics (3) or 6255 Math CAMMP (3)
- READ 6250 Language Development and Reading (3)
- ELED 6691B Seminar in Professional and Leadership Development (1)

COURSES IN ELEMENTARY EDUCATION

ELED 6000. Topics in Elementary Education. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit for different topics. (*Fall, Spring, Summer*)

ELED 6101. Applications of Theories of Human Development and Learning. (3) Review of paradigms of

human development theory as a basis for identifying and clarifying teachers' beliefs about development and learning. Analysis and subsequent improvement of alignment of teachers' instructional practices to their chosen theoretical paradigms. (*Fall, Spring*)

ELED 6111. Critical Issues in Elementary Education. (3) Three categories of instructor-and student-selected issues: government, governance, and the elementary schools; changing educational roles of professional educators, parents, and children; and the evolving missions of elementary schools. Focus on the self as learner and the re-examination of one's beliefs, teaching practices, and learning in multiple contexts. (*Fall*) (*Summer*)

ELED 6220. Integrating the Elementary Program. (3) Prerequisite: ELED 6101. Theoretical and historical roots of the integrated curriculum, factors which have supported or constrained implementation of this model, and methods for meaningful curriculum integration across subject areas and home/school cultures. (*Spring*) (*Summer*)

ELED 6221. Teaching and Learning K-6 Science. (3) Prerequisites: Completion of Phase One. Critical reading and use of the literature in science education, examination of science content taught in the elementary school, multiple models and approaches for teaching and assessing learning in science, required action research project. (*Fall*)

ELED 6241. Teaching and Learning K-6 Social Studies. (3) Prerequisites: Completion of Phase One. Critical reading and use of the literature in social studies education, examination of social studies content taught in the elementary school, multiple models and approaches for teaching and assessing learning in social studies, required action research project. (*Spring*)

ELED 6251. Teaching and Learning Mathematics. (3) Prerequisite: core requirements. Examination of the K-6 mathematics curriculum, including a critical analysis of research literature related to problem solving processes and mathematics learning. (*Yearly*) (*Evenings*)

ELED 6252. Teaching and Learning K-6 Mathematics. (3) Prerequisite: Completion of Phase One. Critical reading and use of the literature in mathematics education, examination of mathematics content taught in the elementary school, multiple models and approaches for teaching and assessing learning in mathematics, required action research project. (*Fall, Spring*)

ELED 6255. Math CAMMP. (3) Computer Applications and Manipulative Mathematics Program. Examination of constructivism in K-8 mathematics teaching, with emphasis on concrete, representational, and symbolic manipulatives; developmentally appropriate computer software; developmentally appropriate instructional tactics; and preparing a thematic instructional module. The course culminates in a week long practicum with elementary students. (*Summer*)

ELED 6470. Elementary Education Clinical Experience. (3-6) Prerequisite: Department approval. Program of experiential learning activities in an approved school setting (K-6). Departmental approval required. (*On demand*)

ELED 6474. Advanced Practicum in Teaching, Learning, and Leadership. (3) Prerequisites: Completion of Phase I and II courses and permission of the department. Advanced study, consideration, selected application, and evaluation of principles and practices which master teachers use to mentor the professional development of peers, collaborate with others, influence educational practices beyond their own classrooms, and support elementary students' development of competence and responsibility for their own learning and behavior. (*Fall, Spring*)

ELED 6691. Seminar in Professional and Leadership Development. (1) Seminar focused on the self-direction and collaboration of teachers as they design, develop, and present their individual program plans, and their capstone experience of the Master's Research Project or Comprehensive Portfolio. Pass/No Credit grading only. Must be repeated once per program phase, for a total of 3 credit hours. (*Spring*)

ELED 6800. Individual Study in Elementary Education. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. (*Fall, Spring, Summer*)

ELED 7999. Master's Degree Graduate Residency Credit. (1) Meets Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive examination. (*Fall, Spring*)

Instructional Systems Technology

- **M.Ed. in Instructional Systems Technology**
- **Graduate Certificate in Instructional Systems Technology**

Department of Educational Leadership
261 College of Education
704-687-8730

M.Ed. in Instructional Systems
www.distanceed.uncc.edu/programs/MIST
[http://education.uncc.edu/eart/programs/master_ist\(1\).htm](http://education.uncc.edu/eart/programs/master_ist(1).htm)

Graduate Certificate in Instructional Systems Technology
www.distanceed.uncc.edu/programs/IST
http://education.uncc.edu/eart/programs/IST_Grad_certificate.htm

Coordinator

Dr. John Gretes

Faculty

John Gretes, Professor
Richard Hartshorne, Assistant Professor
Meredith DiPietro, Assistant Professor
Patti Wilkins, Clinical Assistant Professor

MASTER OF EDUCATION IN INSTRUCTIONAL SYSTEMS TECHNOLOGY

Designed for both teachers in public or private schools and persons in the private sector who wish to increase their instructional technology skills and who seek to develop skills for designing and implementing curriculum and instructional strategies that incorporate instructional systems technology. The M.Ed. Program in Instructional Systems Technology qualifies graduates who already hold either an "A" or "G" level teaching license from the North Carolina Department of Public Instruction (or from another state) for the new Masters/Advanced "M" license in Instructional Technology Specialists: Computers (NC 077) license as well as the Curriculum and Instructional Specialist (NC 113) "M" level license with additional coursework in Curriculum and Supervision. Students should work with an advisor to complete these requirements. Students interested in the Curriculum and Instructional Specialist (NC 113) "M" level license should apply for the Graduate Certificate Program in Curriculum and Supervision. This Master's program is offered as an **Online Program** through the Office of Distance Education. For more information, please visit www.distanceed.uncc.edu/programs/MIST.

Program Objectives

Aligned with the 1997 North Carolina Excellent Schools Act and the propositions of the National Board for Professional Teaching Standards, the program prepares graduates to:

- 1) integrate appropriate technology into learning systems;
- 2) undertake instructional analyses that include task analysis, audience analysis, instructional environment analysis, and both target enabling objectives and measures;
- 3) identify criteria, strategies, services, and information sources for hardware and courseware evaluation, selection, and integration;
- 4) plan, develop, revise, and evaluate courseware using a standard planning process and accepted standards and criteria;

- 5) evaluate instructional technology systems;
- 6) work effectively as members of a design and development team that generates solutions to instructional problems; and
- 7) provide leadership in the field of instructional systems technology systems.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, applicants seeking the new Master's/Advanced Competencies "M" license in Instructional Technology Specialist: Computers must already hold either an "A" or "G" level teaching license from the North Carolina Department of Public Instruction (or its equivalent from another state).

Given the nature and size of the graduate degree program, applicants are only admitted for the Fall of each year. Each entering group of students will be provided a sequence of course offerings for the program. This allows students to know when the courses they will need are offered. Please contact the Graduate School for application deadlines.

Degree Requirements

The M.Ed. Program in Instructional Systems Technology requires a total of 39 hours of courses of foundations courses (18 hours), instructional development courses (6 hours), internship and seminar (6 hours), plus related coursework (9 hours). Students must also complete the "Capstone" experience described below. Students interested in adding the Curriculum and Instructional Specialist (NC 113) "M" level license will need to take additional coursework to complete the Graduate Certificate in Curriculum and Supervision that could include as much as 18 semester hours of additional coursework.

Foundations I (9 hours)

- EIST 6101 The Adult Learner (3)
- RSCH 6101 Educational Research and Evaluation (3)
- EIST 6100 Readings in IST (3)

Foundations II (9 hours)

- EIST 6110 Instructional Design (3)
- EIST 6135 Learning, Media, Resources and Technology (3)
- EIST 6121 Instructional Courseware Authoring (3)

Instructional Development (6 hours)

- EIST 6130 Instructional Development Part I (3)
- EIST 6140 Instructional Development Part II (3)

Internship Seminar (6 hours)

- EIST 6491 Internship and Seminar IST Part I (3)
- EIST 6492 Internship and Seminar IST Part II (3)

Related Coursework (9 hours)

Courses may be selected from the following categories and must be approved by the student's advisor: educational research and evaluation, MIS, technical writing, curriculum and instruction, computer systems and networking,

administration and supervision courses. Students should work with an advisor to determine the related coursework that works best in their program of study. For the most current approved courses, please visit our website at <http://education.uncc.edu/ist>.

Capstone Experience

Students must complete a Master's Project or Thesis. The project may take the form of a thesis, research study, or program development activity. The project is followed by an oral examination in which the student clarifies, expands, and defends his or her master's project. Please contact the Graduate School for information regarding the Thesis requirements. For more specific information regarding the Master's Project or Thesis, please visit the following website: <http://education.uncc.edu/ist>.

Licensure

Instructional Technology Specialist (North Carolina 077)

Program Certification / Accreditations

- National Council for the Accreditation of Teacher Education (NCATE)
- Association for Educational Communications and Technology (AECT) (with National Recognition)
- North Carolina Department of Public Instruction (NCDPI)

GRADUATE CERTIFICATE IN INSTRUCTIONAL SYSTEMS TECHNOLOGY

The Graduate Certificate in Instructional Systems Technology is designed for school system personnel who currently hold a valid "A" or "M" level teaching license and who are seeking the Special Endorsement in Computer Education by the North Carolina Department of Public Instruction.

Others seeking the graduate certificate would include non-school personnel who are working in the area of Training and Development. These professionals in training and development would receive the Graduate Certificate only (i.e., without the Special Endorsement in Computer Education by the North Carolina Department of Public Instruction).

The Graduate Certificate program requires admission through the Graduate School with completed applications filed no later than June 30th of each year for admission during the fall semester of that year.

This Graduate Certificate is offered as an **Online Program** through the Office of Distance Education. For more information, please visit: www.distanceed.uncc.edu/programs/IST.

Course Requirements

- EIST 5100 Computer Applications in Education (3)
- EIST 6100 Readings in Instructional Systems Technology (3)
- EIST 6110 Instructional Design (3)
- EDUC 6135 Learning, Media, Resources and Technology (3)
- EIST 6120 Current Trends in Instructional System Technology (3)
- EIST 6130 Instructional Development - Part I (3)

Admission Requirements

- B.A. or B.S. degree in an appropriate field of study from a regionally accredited institution
- An overall undergraduate GPA of 2.75 or better
- An undergraduate GPA of 3.0 or higher for the last two years of coursework
- Acceptable GRE or MAT scores that meet or exceed the 45th percentile
- Three recommendations from professionals in the field who are able to judge the quality of the applicant as a future student in the degree program
- A valid North Carolina teachers license (For those seeking the 079 license)
- Evidence of strong written and oral communication skills
- A minimum of 2 to 3 years teaching or other professional experience for those seeking admission to the program to gain the 079 license
- Documents reviewed in the admissions process:
 - Undergraduate transcripts
 - GRE or MAT scores
 - Letters of recommendation
 - Written statement of future goals
 - A written statement explaining how the candidate will help the College reach its Diversity Goal
 - Copies of North Carolina teaching license
 - Interview with the Instructional Systems Technology program faculty

Instructional Systems Technology Statement of Purpose Guidelines

Write a narrative essay of no more than 750 words, 12 point font and double-spaced, that responds to the following prompts:

- How will this program help you to achieve your professional goals?
- What skills and knowledge do you hope to acquire and what dispositions do you hope to develop as a result of this program?
- Characterize what you would contribute to the collective learning experiences of your cohort.
- Develop your narrative so that it clearly responds to the prompts and provides the reader with definitive, coherent, and thoughtful expression.

COURSES IN INSTRUCTIONAL SYSTEMS TECHNOLOGY

EIST 5100. Computer Applications in Education. (3) Computer systems and software for enhancing teaching, learning, and educational management; evaluating, selecting, and integrating courseware; focus on current PC operating system, word processing, database, spreadsheet, presentation, Internet, e-mail, and multimedia software. (*Fall, Spring, Summer*)

EIST 6000. Topics in Instructional Systems Technology. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit in different topics. (*Fall, Spring, Summer*)

EIST 6100. Reading in Instructional Systems Technology. (3) Contemporary issues and trends in instructional systems technology, including foundations in learning research, instructional systems design, requirements for instruction, task and needs analysis, learning situations and instructional models, learner characteristics, hardware and software innovations, assessing instructional outcomes, and factors affecting utilization. (*Fall*)

EIST 6101. The Adult Learner. (3) The focus of this course will be on the examination of how adults learn in instructional settings. Characteristics of the adult learner will be examined. Students will investigate adult learning theory as well as current trends and advancements in adult learning. The focus will be on making better instructional decisions and media selection for the education and training of adults. (*Fall, Summer*)

EIST 6102. Readings in Research in Instructional Systems Technology. (3) Current issues and trends in instructional systems technology research including instructional systems design, requirements for instruction, task and needs analysis, learning situations and instructional models, learner characteristics, hardware and software innovations, assessing instructional outcomes, and factors affecting utilization. (*On demand*)

EIST 6110. Instructional Design. (3) Prerequisites: EDUC 6100 and RSCH 6101. Instructional Design and evaluation principles are included and examine Goal and task analysis, analysis of audience, flow chart development, instructional strategies, selection and development of instructional materials, formative and summative evaluation. (*Spring*)

EIST 6120. Current Trends in Instructional Systems Technology. (3) The focus of this course will be on the examination current and future trends in Instructional Systems Technology and Human Performance Consulting. Students will examine the most current literature in the field. Students will examine the instructional technology

professional organization trends and recommendations. (*On demand*)

EIST 6121. Instructional Courseware Authoring. (3) Planning and developing instructional computer courseware using an authoring system to produce courseware that has application in the learning environment. (*Fall*)

EIST 6130. Instructional Development Part I. (3) An introduction to the instructional development process using design team roles of instructional designer, evaluator, technical writer, media support person, and project manager; students develop an instructional materials package (module) to meet a simulated need. (*Fall*)

EIST 6135. Learning Media, Resources and Technology. (3) Selection, use, and evaluation of technological innovations in instructional media. (*Spring*)

EIST 6140. Instructional Development Part II. (3) Prerequisite: EIST 6130. Practical application of the instructional development process using design team roles of instructional designer, evaluator, technical writer, media support person, and project manager; students develop an instructional materials package (module) to meet a real need. (*Spring*)

EIST 6150. Systemic Design of Educational Systems. (3) Prerequisites: RSCH 6101 or RSCH 6110/8110. Concepts and principles of the systemic analysis and design of educational systems will be covered. Emphasis will be given to the analysis of educational systems and the educational/societal trends that impact the systemic design of educational systems. (*On demand*)

EIST 6160. Design of Educational Information Systems. (3) Prerequisites: RSCH 6101 or RSCH 6110/8110. Fundamentals of and planning for educational data systems will be covered. Topics covered will include networking technologies, Internet technologies, firewall technologies, distance education systems, and Information Systems models. Current and future trends in educational information and instructional technologies will also be covered. Emphasis will be placed on planning for and integration of these technologies into educational settings. (*On demand*)

EIST 6491. Internship and Seminar in Instructional Systems Technology Part I. (3) Application of knowledge and skill in instructional systems technology in a cooperating setting on or off campus; also includes a seminar. (*Fall, Spring, Summer*)

EIST 6492. Internship and Seminar in Instructional Systems Technology Part II. (3) Prerequisite: EIST 6491. Continued application of knowledge and skills in instructional systems technology in a cooperating setting on or off campus; also includes a seminar. (*Fall, Spring, Summer*)

EIST 6800. Individual Study in Instructional Systems Technology. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. (*Fall, Spring, Summer*)

EIST 7999. Master's Degree Graduate Residency Credit. (1) Meet Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive examination. (*Fall, Spring, Summer*)

EIST 8000. Topics in Instructional Systems Technology. (1-6) May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit in different topics. (*Fall, Spring, Summer*)

EIST 8100. Reading in Instructional Systems Technology. (3) Contemporary issues and trends in instructional systems technology, including foundations in learning research, instructional systems design, requirements for instruction, task and needs analysis, learning situations and instructional models, learner characteristics, hardware and software innovations, assessing instructional outcomes, and factors affecting utilization. (*Fall*)

EIST 8101. The Adult Learner. (3) The focus of this course will be on the examination of how adults learn in instructional settings. Characteristics of the adult learner will be examined. Students will investigate adult learning theory as well as current trends and advancements in adult learning. The focus will be on making better instructional decisions and media selection for the education and training of adults. (*Fall, Summer*)

EIST 8102. Readings in Research in Instructional Systems Technology. (3) Current issues and trends in instructional systems technology research including instructional systems design, requirements for instruction, task and needs analysis, learning situations and instructional models, learner characteristics, hardware and software innovations, assessing instructional outcomes, and factors affecting utilization. (*On demand*)

EIST 8120. Current Trends in Instructional Systems Technology. (3) The focus of this course will be on the examination current and future trends in Instructional Systems Technology and Human Performance Consulting. Students will examine the most current literature in the field. Students will examine the instructional technology professional organization trends and recommendations. (*On demand*)

EIST 8121. Advanced Instructional Design. (3) Advanced instructional design techniques; systems development; task analysis; sequencing and delivery systems. (*On demand*)

EIST 8150. Systemic Design of Educational Systems. (3) Prerequisites: RSCH 6101 or RSCH 6110/8110. Concepts and principles of the systemic analysis and design of educational systems will be covered. Emphasis will be given

to the analysis of educational systems and the educational/societal trends that impact the systemic design of educational systems. (*On demand*)

EIST 8160. Design of Educational Information Systems. (3) Prerequisites: RSCH 6101 or RSCH 6110/8110. Fundamentals of and planning for educational data systems will be covered. Topics covered will include networking technologies, Internet technologies, firewall technologies, distance education systems, and Information Systems models. Current and future trends in educational information and instructional technologies will also be covered. Emphasis will be placed on planning for and integration of these technologies into educational settings. (*On demand*)

EIST 8800. Individual Study in Instructional Systems Technology. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. (*Fall, Spring, Summer*)

Middle Grades and Secondary Education

- **Master's in Education (M.Ed.)**

Department of Middle Grades, Secondary, and K-12 Education

324 College of Education
704-687-8875
<http://education.uncc.edu/mdsk>

Coordinator

Dr. Warren J. DiBiase

Graduate Faculty

Barbara Blackburn, Assistant Professor
Warren DiBiase, Associate Professor
Paul Fitchett, Assistant Professor
Adam Harbaugh, Assistant Professor
Tina Heafner, Associate Professor
Charles Hutchison, Assistant Professor
Jeanneine P. Jones, Professor
Scott Kissau, Assistant Professor
Theresa Perez, Professor
Teresa Petty, Assistant Professor
David Pugalee, Professor
Lan Quach, Assistant Professor
Spencer Salas, Assistant Professor
Rosemary Traore, Assistant Professor
Greg Wiggan, Assistant Professor

MASTER OF EDUCATION IN MIDDLE & SECONDARY GRADES

The Master of Education in Middle and Secondary Grades has been developed specifically for experienced teachers in middle and secondary schools who desire advanced study in content and pedagogy, and seek an opportunity to integrate advanced study with their teaching experiences. In addition, candidates will acquire the skills, knowledge and abilities required to assume a leadership role. For example, candidates are required to take Teacher Leadership in their final semester, a course that will better prepare them to become content department chairs, interdisciplinary team leaders, or staff development specialists. Furthermore, by admitting only experienced teachers, candidates will serve as resources for one another and become active members in a community of professionals who are knowledgeable, reflective, responsive, and effective practitioners. Finally, because this degree focuses on a teacher's professional growth, it requires completion of a comprehensive portfolio or research project.

Program Goals

Successful graduates will possess a comprehensive pedagogical, conceptual, and reflective knowledge base that can be applied to their classrooms through effective instruction, responsivity and collaboration. This developed and applied knowledge will be, in turn, shared with other professionals through a variety of leadership opportunities. Both the College's Conceptual Framework and the following goals provide structure for the entire program:

Program graduates will be able to:

- 1) Self-direct their personal and professional growth
- 2) Respond effectively to adolescent differences, equity and diversity
- 3) Demonstrate advanced pedagogical content knowledge of the curriculum
- 4) Improve educational practice through critical self-reflection, self-assessment, and applied research
- 5) Work collaboratively with colleagues, professionals, parents, guardians, families and individuals charged with the well being of learners
- 6) Assume a leadership role at the local, district, regional, state, or national level

Admission Requirements

- 1) A Bachelor's degree from a regionally accredited college or university
- 2) A North Carolina "A" license in Middle Grades or Secondary Education, or the equivalent from another state in both the track and content field of the program to which the candidate is making application
- 3) Teaching experience in a middle grades or secondary classroom
- 4) An undergraduate GPA of 2.75 overall and 3.0 in the junior/senior years
- 5) An acceptable score on the GRE or MAT

- 6) A written narrative providing a statement of purpose for Master's degree study
- 7) Satisfactory recommendations from three professional educators

Degree Requirements

This degree requires a total of 39 hours of coursework in either middle grades or secondary education. Candidates must fulfill requirements in one of these two tracks.

Tracks

There are two tracks within this degree. One focuses on middle grades education and the other on secondary education. Each requires a total of 39 hours as prescribed by program requirements.

Core Courses

There are five core courses required that are common to both the middle grades and secondary tracks. These include:

- RSCH 6101 Educational Research Methods (3)
- MDSK 6356 Curriculum Studies (3)
- MDSK 6150 Models of Teaching (3)
- MDSK 6260 Principles of Teacher Leadership (3)
- MDSK 6691 Seminar in Professional Development (3)

Electives

Each track allows one three-hour elective.

Capstone Experience

Candidates in both middle grades and secondary must complete a capstone experience. They may choose from either a comprehensive portfolio or research project.

Advising

Each candidate will have an assigned advisor within the Department of Middle Grades, Secondary, and K-12 Education. Candidates will have access to a second advisor in their area of content specialization through the College of Liberal Arts and Sciences.

Licensure

Graduates will be eligible to receive an Advanced Competency "M" license from the state of North Carolina in addition to their Master's Degree.

Qualifying Examination

Acceptable scores on either the GRE or MAT.

Committees

Candidates will convene a committee of three graduate faculty members whom they will select with assistance from their Department advisor. The primary role of this committee is to assess the students' comprehensive portfolio or research project.

Research Opportunities and Experiences

There are many opportunities for candidates to participate in research studies on either an independent or collaborative

basis. These opportunities are available with Department faculty members, through assigned course work, and through the research project.

Assistantships

There are limited opportunities available within the Department of Middle Grades, Secondary, or K-12 Education. Contact the Department at 704-687-8875 for more information.

Program Certifications/Accreditation

Programs are accredited by both NCATE and NCDPI.

Middle Grades Education

Degree Requirements

Total of 39 hours

Core Courses:

- RSCH 6101 Educational Research Methods (3)
- MDSK 6356 Curriculum Studies (3)
- MDSK 6150 Models of Teaching (3)
- MDSK 6260 Teacher Leadership (3)
- MDSK 6691 Seminar in Professional Development (3)

Middle Grades:

- MDSK 6220 Adolescence and Learning (3)
- MDLG 6225 Issues in Middle Grades Education (3)

Methods Course: Choose one from your content concentration (3)

- MDSK 6351 Advanced Methods in Middle and Secondary Science (3)
- MAED 5040 Topics in Mathematics Education: Intermediate (3)
- ENGL 6274 Contexts and Issues in the Teaching of English (3)
- MDSK 6354 Advanced Methods in Middle and Secondary Social Studies (3)

Content Specialization Requirements: 12 hours

The content field of study may be chosen from one of the following areas:

- Science
- Social Studies
- Mathematics
- English

Professional Elective: 3 hours

Graduate-level electives should be chosen in consultation with student's advisor. Other departments offer appropriate electives. Possible elective options include, but are not limited to, the following:

- EDUC 6102 Person and School in Urban Society (3)
- EIST 6110 Instructional Design (3)
- RSCH 6109 Assessment and Evaluation Methods (3)
- RSCH 6110 Descriptive and Inferential Statistics in Education (3)

- TESL 5101 Second Language Diagnosis and Evaluation (3)
 TESL 5103 Teaching English as a 2nd Language (3)
 EDUC 7126 Comparative Education (3)
 MDSK 6250 Issues in 6-12 Science Education (3)
 MDSK 6251 Issues in 6-12 Math Education (3)
 MDSK 6254 Issues in 6-12 Social Studies Educ (3)
 MDLG 6800 Individual Study in Middle Grades Education (1-6)

Secondary Education

Degree Requirements

Total of 39 hours

Core Courses:

- RSCH 6101 Educational Research Methods (3)
 MDSK 6356 Curriculum Studies (3)
 MDSK 6150 Models of Teaching (3)
 MDSK 6260 Teacher Leadership (3)
 MDSK 6691 Seminar in Professional Development (3)

Methods Course: Choose one from your content concentration (3)

- MDSK 6351 Advanced Methods in Middle and Secondary Science (3)
 MDSK 6354 Advanced Methods in Middle and Secondary Social Studies (3)

Content Specialization Requirements: 18 hours

The content field of study may be chosen from one of the following areas:

- Science
 Social Studies

Note: Master's degrees in mathematics and English education are offered through the Departments of Mathematics & Statistics and English, respectively.

Professional Elective: 3 hours

Graduate-level electives should be chosen in consultation with student's advisor. Other departments offer appropriate electives. Possible elective options include, but are not limited to, the following:

- EDUC 6102 Person and School in Urban Society (3)
 EIST 6110 Instructional Design (3)
 RSCH 6109 Assessment and Evaluation Methods (3)
 RSCH 6110 Descriptive and Inferential Statistics in Education (3)
 TESL 5101 2nd Language Diagnosis & Evaluation (3)
 TESL 5103 Teaching English as a Second Language (3)
 EDUC 7126 Comparative Education (3)
 MDSK 6250 Issues in 6-12 Science Education (3)
 MDSK 6251 Issues in 6-12 Math Education (3)
 MDSK 6254 Issues in 6-12 Social Studies Educ. (3)
 SECD 6800 Individual Study in Secondary Educ. (1-6)

COURSES IN MIDDLE GRADES EDUCATION AND SECONDARY EDUCATION

Core Courses

MDSK 6150. Models of Teaching. (3) Learning theory associated with information processing, personal, social, and behavioral models; current trends in instructional methodology for a variety of content areas. (*Spring*) (*Evening*)

MDSK 6260: Teacher Leadership. (3) An examination of the current research on adult learning and development, expert knowledge, and the professionalization of the field of teaching. Students develop skills to direct other educational professionals. (*Fall, Spring*) (*Evening*)

MDSK 6356. Curriculum Studies. (3) Examination of the field of curriculum study with particular emphasis on the change process. (*Fall*) (*Evening*)

MDSK 6691. Seminar in Professional Development (3). Seminar focused on the self-direction and professional development of teachers. Emphasis will be placed on the design, development, and completion of the candidate's comprehensive portfolio, thesis, or research project. (*Fall, Spring*) (*Evening*)

Middle Grades Education:

MDSK 5200. Secondary Methods – Foreign Languages. (3) Prerequisite: Admission to the Graduate Certificate in Teaching or the Master of Arts in Teaching and permission of the Department. Current trends and practices in teaching foreign and second languages in high school, with emphasis on practical applications. Addresses state mandated competencies. Required for licensure in the teaching of French, German, or Spanish (K-12). (*Fall*)

MDSK 5201. Elementary Methods – Foreign Languages. (3) Admission to the Graduate Certificate in Teaching or the Master of Arts in Teaching and permission of the Department. Current trends and practices in teaching foreign and second languages in the elementary school and the middle school (K-8), with emphasis on practical applications. Addresses state mandated competencies. Required for licensure in the teaching of French, German, or Spanish (K-12). (*Spring*)

MDSK 6220. Adolescence and Learning. (3) Study of adolescence as a phase of development and its relationship to the learning process. (*Fall*) (*Evening*)

MDLG 6225. Issues in Middle Grades Education. (3) Examination of educational practices in the middle grades (6-9) including trends and issues unique to that philosophy. Emphasis on broadening understanding of foundational components, organizational patterns, instructional programs and management techniques. (*Spring*) (*Evening*)

MDSK 6464. Primary and Secondary Source Analysis.

(3) This course is a 3-hour advanced content course for middle and secondary social studies teachers seeking advanced social studies licensure. The course provides a focused study of primary and secondary sources that effectively support middle and secondary student understanding of social studies content. Emphases include increased content knowledge of social studies, extensive content research and reading, development of content resources, application of advanced instructional methods through the integration of content resources to support student learning of social studies content, and experience in curriculum evaluation.

MDLG 6800. Individual Study in Middle Grades

Education. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. (*Fall, Spring, Summer*)

*Advanced Graduate Only***MDLG 7999. Master's Degree Graduate Residency**

Credit. (1) Meets Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive examination. (*Fall, Spring*)

Secondary Education:**SECD 6800. Individual Study in Secondary Education.** (1-

6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. (*Fall, Spring, Summer*)

*Advanced Graduate Only***SECD 7999. Master's Degree Graduate Residency Credit.**

(1) Meets Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive examination. (*Fall, Spring*)

Methods Courses:**MDSK 6351. Advanced Methods in Middle and**

Secondary Science. (3) Examination of current research and scholarship on the teaching of science in middle and secondary schools. Particular emphasis on the development of advanced instructional expertise and leadership. (*On demand*)

MDSK 6354. Advanced Methods in Middle and

Secondary Social Studies. (3) Examination of current research and scholarship on the teaching of social studies in middle and secondary schools. Particular emphasis on the development of advanced instructional expertise and leadership. (*On demand*)

Examples of Possible Electives:**MDSK 6250. Issues in 6-12 Science Education.** (3)

Orientation to content, curriculum and methods appropriate for teaching science. Emphasis is on a critical

examination of current trends and practices in the teaching of science. (*On demand*)

MDSK 6251. Issues in 6-12 Mathematics Education. (3)

Orientation to content, curriculum and methods appropriate for teaching mathematics. Emphasis is on critical examination of current trends and practices in the teaching of mathematics. (*On demand*)

MDSK 6254. Issues in 6-12 Social Studies Education. (3)

Current issues in teaching and learning social studies. Emphasis on current trends in curriculum, advanced instructional methods, and research. (*On demand*)

Reading Education

- **M.Ed. in Reading Education**

Department of Reading and Elementary Education

367 College of Education

704-687-8889

<http://education.uncc.edu/reel/>

Coordinator

Dr. Karen D. Wood

Graduate Faculty

Jennifer Hathaway, Assistant Professor

Brian Kissel, Assistant Professor

Adriana Medina, Assistant Professor

Maryann Mraz, Associate Professor

Paola Pilonieta, Assistant Professor

Robert J. Rickelman, Professor

D. Bruce Taylor, Assistant Professor

Jean Vintinner, Clinical Assistant Professor

Karen D. Wood, Professor

MASTER OF EDUCATION IN READING EDUCATION

Designed for experienced teachers, the M.Ed. Program in Reading Education qualifies graduates for the Masters/Advanced Competencies "M" license in K-12 reading education. Relevant to all areas of the K-12 curriculum, this program is designed for classroom teachers and aspiring literacy specialists who are interested in improving instructional programs and practices that promote literacy among all learners.

Program Objectives

Based on professional standards published by the International Reading Association, the program prepares graduates to assume the role of a reading professional who: (1) provides specialized K-12 literacy instruction and assessment in cooperation with other professionals to students in schools, reading resource centers, or clinics, (2) works cooperatively and collaboratively with other professionals in planning classroom and school wide programs to meet the needs of a diverse population of learners, (3) serves as a resource in the area of literacy education for teachers, administrators, and the community, and (4) provides leadership in literacy instruction through mentoring and staff development.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, applicants must hold an A level license in any teaching field from the North Carolina Department of Public Instruction (or its equivalent from another state).

Degree Requirements

The M.Ed. Program in Reading, Language, and Literacy Education requires a total of 39 hours of courses to be taken in three sequenced phases: Developing Plans and Perspectives (10 hours), Expanding Content and Pedagogical Knowledge (10 hours), Influencing Literacy Instruction (7 hours), plus 6 hours of electives.

Phase I: Developing Plans and Perspectives (16 hours)
 READ 6100 Current Issues and Practices in Literacy (3)
 READ 6252 K-12 Writing Development & Instruction (3)
 READ 6691A Seminar in Professional Development (1)
 RSCH 6101 Introduction to Educational Research (3)
 RSCH 7111 Qualitative Research Methods in Education (3) or alternate graduate level research course approved by advisor (May delay until Phase II)
 ENGL XXXX Any advisor-approved graduate course in juvenile literature (May delay until Phase II)

Phase II: Expanding Content and Pedagogical Knowledge

(10 hours)

EDUC 6254 Teaching Diverse Learners (3)
 READ 6250 Emergent and Elementary Literacy (3)
 READ 6255 Middle/Secondary Reading and Writing (3)
 READ 6691B Seminar in Professional Development (1)

Phase III: Influencing Literacy Instruction

(7 hours)

READ 6260 Diagnostic Assessment and Instruction in Reading (3)
 READ 6474 Collaborative Leadership in Literacy Education (3)
 READ 6691C Seminar in Professional Development (1)

Elective Courses

(6 hours)

Courses may be selected from the following categories and must be approved by the student's advisor: Pedagogy, Research, Diversity, Resources, and Leadership.

Capstone Experience

Students have the choice of a Master's Research Project or a Master's Comprehensive Portfolio. The final document will be presented to graduate students and faculty during READ 6691 C: Seminar in Professional Development. A committee of graduate faculty using the department's scoring rubric will evaluate both the presentation and the document.

Assistantships

The Department typically has a limited number of Graduate Assistantships, pending resources. Applications are available from the Department of Reading and Elementary Education.

COURSES IN READING EDUCATION

READ 6000. Topics in Reading, Language, and Literacy. (1-6) Cross-listed as EDCI 8040. May include classroom and/or clinic experiences in the content area. With department approval, may be repeated for credit for different topics. (*Fall, Spring, Summer*)

READ 6100. Current Issues and Practices in Literacy Education. (3) Cross-listed as EDCI 8140. Theories, research, and instructional methods associated with reading and language arts, preschool through high school; questions of effectiveness related to instructional approaches and materials; related topics such as multicultural literacy, the role of phonics, and assessment. (*Fall*) (*Evenings*)

READ 6250. Emergent and Elementary Literacy. (3) Cross-listed as EDCI 8250. Prerequisite: Completion of Phase I. Critical reading and use of the literature in literacy education, examination of literacy content taught in the K-6 curriculum with an emphasis on pre-K and beginning reading instruction research, theory and practice, multiple models and approaches for teaching and assessing learning in literacy development, required action research project. (*Fall*) (*Evenings*)

READ 6252. K-12 Writing Development and Instruction. (3) Cross-listed as EDCI 8252. Theories, research, and critical issues related to students' writing development and effective writing instruction. Field experience required. (*Spring, Summer*) (*Evenings*)

READ 6255. Middle/Secondary Reading and Writing. (3) Cross-listed as EDCI 8255. Prerequisite: Completion of Phase I. Theories, research, and instructional methods associated with reading and writing in the content areas, with a special emphasis on grades 6-12. Field experience and action research project are required. (*Spring*) (*Evenings*)

READ 6260. Diagnostic Assessment and Instruction in Reading. (3) Cross-listed as EDCI 8256. Prerequisite: Completion of Phase II. Examination, uses, and critique of theories and research about literacy processes and problems;

diagnosis and correction of reading disabilities; instructional strategies and action research designed to improve reading proficiency. (Fall) (Evenings)

READ 6474. Collaborative Leadership in Literacy Education. (3) Cross-listed as EDCI 8254. Prerequisites: Completion of Phase II and READ 6260 course. Investigates models and strategies for assuming the leadership responsibilities of a literacy specialist, including mentoring, staff development, school-wide literacy program development and assessment, supporting the action research of teachers, and developing partnerships with parents and community volunteers. (Spring) (Evenings)

READ 6691A/B/C. Seminar in Professional Development. (3) Prerequisites: None for READ 6691A; completion of Phase I for READ 6691B; completion of READ 6260 for READ 6691C. Seminar focused on the self-direction and professional development of literacy specialists, with an increasing emphasis on becoming instructional leaders, as students plan to meet their own learning needs in instructional expertise; expand their awareness of the role of the literacy specialist; design, develop, and present their basic program portfolio and their Master's Research Project or Comprehensive Portfolio. (Taken for one credit in Phase I [READ 6691A]; one in Phase II (READ 6691B) and one in Phase III [READ 6691C] for a total of three credits.) (Fall, Spring) (Evenings)

READ 6800. Individual Study in Reading, Language, and Literacy. (1-6) Cross-listed as EDCI 8840. Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. (Fall, Spring, Summer)

Advanced Graduate ONLY

READ 7999. Master's Degree Graduate Residency Credit. (1) Meets Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive exam. (Fall, Spring, Summer)

Special Education

- **Ph.D. in Special Education**
- **M.Ed. in Special Education** (for individuals with a bachelor's degree with a major and license in special education)
- **M.A.T. in Special Education** (for individuals with a bachelor's degree, not in special education, who are seeking licensure and a master's degree in special education or for individuals who are enrolled in or who recently completed the Graduate Certificate in Adapted or General Curriculum)

- **Graduate Certificate in Special Education: Adapted Curriculum** (for individuals seeking NC Standard Professional I license)
- **Graduate Certificate in Special Education: General Curriculum** (for individuals seeking NC Standard Professional I license)
- **Graduate Certificate in Academically or Intellectually Gifted (AIG)**

Department of Special Education and Child Development

348 College of Education

704-687-8772

<http://education.uncc.edu/spcd>

Coordinator for Ph.D. Program

Dr. Diane Browder

Coordinators for M.Ed. Programs

Dr. Kelly Anderson

Dr. Brenda Romanoff

Coordinators for M.A.T. and Graduate Certificate Programs

Dr. John Beattie

Dr. Brenda Romanoff

Graduate Faculty

Kelly Anderson, Assistant Professor

Bob Algozzine, Professor

Janet Baxter, Clinical Assistant Professor

John Beattie, Assistant Professor

Diane Browder, Distinguished Professor

Mary Lynne Calhoun, Professor and Dean, College of Education

Gloria Campbell-Whatley, Associate Professor

Nancy Cooke, Associate Professor

LuAnn Jordan, Associate Professor

Ya-yu Lo, Assistant Professor

Christopher O'Brien, Assistant Professor

Brenda Romanoff, Assistant Professor

JaneDiane Smith, Assistant Professor

Fred Spooner, Professor

David Test, Professor

Shawnee Wakeman, Lecturer

Richard White, Professor

Charles Wood, Assistant Professor

Wendy Wood, Associate Professor

PH.D. IN SPECIAL EDUCATION

The doctoral program at UNC Charlotte prepares special educators as collaborators, teachers, leaders, and researchers whose work contributes to enhancing the quality of life of

individuals who are exceptional learners and their families. This program offers graduates the widest array of career options and provides the solid research foundation needed for the rapidly changing field of special education. Potential employment for program graduates includes leadership positions in schools and agencies and faculty positions in higher education as teacher trainers/ researchers.

The program requires 59 credits beyond the master's degree and builds on the Master of Education in Special Education or a comparable program. These hours include 15 credits in doctoral seminars in special education, 14 credits in research and practice (field work and writing courses), 15 credits in research, 15 credits of an individually designed specialty, and a dissertation. Additional coursework may be required for students who do not have a Master's degree or licensure in Special Education; whose master's program was not comparable to UNC Charlotte's; or whose Master's coursework is outdated.

The program will accept up to two courses as transfer from a regionally accredited doctoral granting institution, providing the Special Education Doctoral Committee determines that the course or courses to be transferred are equivalent to similar courses required in the UNC Charlotte Special Education Ph.D. program or fit the specialty area. The grade in these transfer courses must be an A or B. Transfer credits cannot replace the four core doctoral seminars in special education and all of the dissertation work must be completed at UNC Charlotte.

Timelines

Students are admitted for either full-time study or intensive part-time study and begin in the Fall semester. Students must complete their degree, including the dissertation, within 8 years. The minimum time for completion for a full-time student is 3 years. Full-time students must meet benchmark requirements each year to maintain their status as a doctoral student. Part-time students also must meet benchmark requirements that occur approximately every two years. These benchmarks are intended to help students achieve their goal of completing the doctorate in a timely manner.

Additional Admission Requirements

Applications for admission will be accepted once a year to begin doctoral studies in the fall semester and must be submitted to the Graduate Admissions Office by December 1st.

The following documents must be submitted in support of the application:

- 1) One official transcript of all academic work attempted since high school indicating a GPA of 3.5 (on a scale of 4.0) in a graduate degree program.*
- 2) Official report of score on the GRE or MAT that is no more than 5 years old.*
- 3) At least three references* of someone who knows the applicant's current work and/ or academic achievements in previous degree work.

- 4) A two page essay describing prior experiences with individuals with exceptionalities and objectives for pursuing doctoral studies.*
- 5) A current resume or vita.
- 6) A professional writing sample (e.g., published article, manuscript submitted for publication, term paper submitted in prior coursework, abstract of thesis, teaching manual).
- 7) Documentation of teaching and other field experience (e.g., copy of teaching evaluation or letter recommendation from supervisor.)
- 8) An interview with the program faculty.
- 9) International students must submit official and acceptable English language proficiency test scores on the Test of English as a Foreign Language (TOEFL), the Michigan English Language Assessment Battery (MELAB), or the IELTS. All tests must have been taken within the past two years.* See the Graduate School's website for minimum acceptable scores.

**These items are required of applicants to any of UNC Charlotte's doctoral programs.*

Degree Requirements

Doctoral Seminars in Special Education (15 credits)

- SPED 8671 Doctoral Seminar in Research in Special Education (3)
- SPED 8672 Doctoral Seminar in Leadership in Special Education (3)
- SPED 8673 Doctoral Seminar in Diversity and Collaboration (3)
- SPED 8674 Doctoral Seminar in Teaching in Special Education (3)
- SPED 8699 Dissertation Seminar (3)

Research and Practice in Special Education (9 credits)

Note: The following courses are used in the development of portfolios I and II.

- SPED 8471 Professional Writing (2) (Take concurrent with SPED 8671)
- SPED 8472 Research Implementation (2) (Take concurrent with SPED 8271)
- SPED 8473 Grant Writing (2) (Take concurrent with SPED 8673)
- SPED 8474 Supervision of Student Teachers (3)

One of these:

- SPED 8475 College Teaching (3) (Take after co-teaching at least one course)
- SPED 8476 Internship (3) (Take anytime after completion of first 24 credits; May be in higher education, government, agency, school district)

Research (15 credits + Doctoral Seminar in Research & Dissertation Seminar)

- RSCH 8110 Descriptive and Inferential Statistics (3)
- RSCH 8120 Advanced Statistics (3)
- RSCH 8113 Single-Case Research (3)

Select 2 of the following:

- RSCH 6130 Presentation and Computer Analysis of Educational Data (3)
- RSCH 8140 Multivariate Statistics (3)
- RSCH 8211 Qualitative Research Methods in Education (3)
- RSCH 8212 Survey Research Methods in Education (3)
- RSCH 8296 Program Evaluation Research Methods in Education (3)

Specialty (15 credits)

An individually designed specialty of graduate courses developed by student and advisor and approved by the Special Education Doctoral Committee. This specialty will typically be related to the student's major area of expertise (e.g., BED, LD, MD, SP, EC, Gifted, Transition), but students are encouraged to consider coursework in general education or other disciplines (e.g., taking Ed. Leadership coursework to get the 113 Certification Curriculum Instruction Specialist Certificate). It is strongly recommended that this specialty include:

- Co-teaching in one or more licensure or other courses related to student's specialty
- One or more SPED 8670 Advanced Research Topics in Special Education courses

Dissertation (3+ credits)

Additional Degree Requirements

In addition to coursework and the dissertation, students complete a portfolio of achievements related to the four focus areas: leadership, collaboration and diversity, teaching, and research. This portfolio must receive satisfactory ratings from the Portfolio Review Committee at two critical junctures known as Benchmark One and, Two. The first benchmark serves as a Qualifying Examination and includes demonstration of writing, teaching, and research skills. The second benchmark is comparable to the comprehensive exams required by some Ph.D. programs in Special Education and includes the development of a grant. Students receive opportunities to build this portfolio through the Research and Practice coursework. The following are some of the products in the portfolio: research based paper, journal review, conference presentation, personal leadership plan, grant proposal, quality enhancement plan, and research report.

Admission to Candidacy

Once the student has an approved dissertation proposal, an application for candidacy should be submitted first to the advisor, then to the portfolio committee, and the Doctoral Coordinator. The application for candidacy must be submitted at least 4 weeks before the semester in which the student graduates. In the Special Education program, it is recommended that this application be made as soon as the proposal has been approved.

Dissertation Requirements

The purpose of the dissertation is for doctoral students to demonstrate their ability to synthesize the professional literature and generate new knowledge for the profession through using well-established research tools. For the Ph.D. in Special Education, the dissertation may be quantitative (group or single subject) or qualitative research. Whatever type of design, it must adhere to current standards for quality as reflected in professional writing on the chosen method of research design and reflected in the current literature. Students must be continuously enrolled for dissertation research credits through the semester of graduation. Defense of the dissertation is conducted in a final oral examination that is open to the university community.

Application for Degree

Students must submit an Application for Degree during the semester in which they successfully defend their dissertation proposal. Adherence to Graduate School deadlines is expected. Degree requirements are completed when students successfully defend their dissertation and file the final copy of the dissertation in the Graduate School.

MASTER OF EDUCATION IN SPECIAL EDUCATION

For the major in Special Education, a bachelor's degree with a major in special education and a Standard Professional I license in special education from the North Carolina Department of Public Instruction (or its equivalent from another state) are required. For the major in Academically or Intellectually Gifted, a Standard Professional I license in an elementary, middle, or secondary education teaching field is required.

Program of Study

The mission of the Special Education (SPED) program is to "develop excellent professionals" for educational roles in public and private educational agencies and nonprofit agencies. The 39-hour M.Ed. in Special Education is organized around five major goals. These goals and related experiences are designed to help teachers: 1) become data-based decision makers; 2) evaluate and implement evidence-based instruction for students with disabilities; 3) demonstrate advanced knowledge of child development, instructional content and pedagogy; 4) draw on research, experience, and professional judgment to lead others in collaborative planning; and 5) become self-reflective, lifelong learners. The program is responsive to expectations set forth by NCATE (National Council for the Accreditation of Teacher Education), NCDPI (North Carolina Department of Public Instruction), NBPTS (National Board of Professional Teacher Standards), CEC (Council for Exceptional Children), and the 1997 NC Excellent Schools Act. By focusing on "best practices" in special education and teacher education, the SPED program has established a model program that continuously achieves

regional, state, and national recognition in scholarship, teaching, and research.

Additional Admission Requirements

- 1) Official transcripts of all previous academic work attempted beyond high school documenting undergraduate GPA of 2.75 overall and 3.0 in Jr/Sr years.
- 2) Official agency reports of satisfactory GRE or MAT test scores (30th percentile or above).
- 3) At least three evaluations from professional educators familiar with the applicant's personal and professional qualifications.
- 4) A one or two page essay describing the applicant's experience and objective in undertaking graduate study.

Degree Requirements

Major in Special Education

Required Courses

- RSCH 6101 Research Methods (3)
- EDUC 6254 Individualizing Instruction for Diverse Learners (3)
- ADMN 6106 Legal Issues in Special Education (3)
- SPED 6503 Instructional Design in Special Education (3)
- SPED 6690 Consultation and Collaboration (3)
- SPED 6502 Advanced Classroom Management (3)

Prerequisite Course to Capstone

- RSCH 7113 Single-Case Research (3)

Capstone courses

- SPED 6691a Seminar in Professional and Leadership Development (1)
- SPED 6691b Seminar in Professional and Leadership Development (1)
- SPED 6691c Seminar in Professional and Leadership Development (1)

Electives (15 hours)

Major in Academically or Intellectually Gifted

Phase I: Developing Perspective (7 hours)

- RSCH 6101 Research Methods (3)
- SPED 5211 Nature and Needs of Gifted Students (3)
- SPED 6691a Seminar in Professional and Leadership Development (3)

Phase II: Content and Pedagogy (25 hours)

- SPED 6124 Methods of Instructing Gifted Students (3)
- SPED 6161 Social and Emotional Needs of Gifted Students (3)
- SPED 6224 Adapting Curriculum Materials and Classroom Differentiation (3)

SPED 6241 Constructing Curriculum for Gifted Students (3)

SPED 6000 Topics in Special Education: AIG (3)

SPED 6270 Planning and Evaluation of Gifted Programs (3)

SPED 6271 Leadership in Gifted Education (3)

SPED 6691b Seminar in Professional and Leadership Development (1)

RSCH course as approved by advisor (3)

Elective (3)

Phase II: Content and Pedagogy (4 hours)

SPED 6690 Consultation and Collaboration (3)

SPED 6691c Seminar in Professional & Leadership Development (1)

Admission to Candidacy Requirements

Apply no later than the announced deadline, early in the last semester of your program. Full-time students must have completed 19 hours and be enrolled for at least an additional 10 hours. Part-time students must have completed at least 31 hours.

Assistantships

The Program typically has a limited number of graduate assistantships with salaries starting at \$8,000/ academic year. Applications are available from the Department of Special Education and Child Development (704-687-8772).

Internships

No required internship.

Clinicals

Most courses require students to apply the knowledge learned in classes to public/private school classrooms.

Capstone Experiences

The capstone experience will be fulfilled by completing either a Master's Research Project (recommended) or a Comprehensive Portfolio (with approval of advisor).

Electives

The major in Special Education includes 15 elective hours. These hours will enable students to add-on an additional North Carolina teaching license in Adapted Curriculum, General Curriculum or a specific disability area (e.g., behavioral-emotional disabilities, learning disabilities), or complete an individualized set of courses developed as a result of participating in the first SPED 6691 seminar or from discussing possibilities with their advisor. Students in the major in Academically and Intellectually Gifted program have 3 elective hours.

Advising

Upon acceptance into the program all students are assigned an advisor. Students are expected to meet with their advisor each semester to discuss their coursework.

Licensure

Successful completion will lead to a North Carolina masters/advanced competencies license.

Committees

Each student will have a committee of two graduate faculty members who will provide guidance through the Capstone Experience. The committee will include the student's advisor, as well as one additional graduate faculty member chosen by the student.

Application for Degree

Apply no later than the announced deadline, early in the last semester of your program. Full-time students must have completed 19 hours and be enrolled for at least an additional 10 hours. Part-time students must have completed at least 31 hours.

Research Opportunities/Experiences

The Special Education faculty continuously achieves regional, state, and national recognition in scholarship, teaching, and research. As a result students will have the opportunity to become involved in an applied research project

Tuition Waivers

A person may qualify for in-state tuition if he/she; is paid on the teacher salary schedule, has established legal residence in North Carolina, is employed full-time by a North Carolina public school, but only for "courses relevant to teacher certification or to professional development as a teacher." For more information on the "Teacher Tuition Benefit Application," please visit <http://resdetermination.uncc.edu>.

Financial Aid/ Financial Assistance

Information is available from the Teacher Education Advising and Licensure Office (TEAL) located in Room 119, College of Education. (704-687-8725)

Program Approval

The programs for both majors in the M.Ed. in Special Education have been approved by NCDPI.

M.A.T. IN SPECIAL EDUCATION

The Master of Arts in Teaching (M.A.T.) program is designed for individuals with a bachelor's degree and major other than special education. Completion of Phase I of the M.A.T. leads to a Standard Professional I license in special education (either General Curriculum or Adapted Curriculum) then completion of the remaining requirements leads to a master's degree and upgrades the Standard Professional I license to an advanced license. Individuals who are enrolled in or who have completed the Graduate Certificate licensure program at UNC Charlotte may also apply. For more information on the MAT, please visit our website at <http://education.uncc.edu/mat>.

Program of Study

The mission of the Special Education (SPED) program is to "develop excellent professionals" for educational roles in public and private educational agencies and nonprofit agencies. The 39-hour M.A.T. in Special Education is organized around five major goals. These goals and related experiences are designed to help teachers: 1) become data-based decision makers; 2) evaluate and implement evidence-based instruction for students with disabilities; 3) demonstrate advanced knowledge of child development, instructional content and pedagogy; 4) draw on research, experience, and professional judgment to lead others in collaborative planning; and 5) become self-reflective, lifelong learners. The program is responsive to standards set forth by NCATE (National Council for the Accreditation of Teacher Education), NCDPI (North Carolina Department of Public Instruction), NBPTS (National Board of Professional Teacher Standards), CEC (Council for Exceptional Children), and the 1997 NC Excellent Schools Act. By focusing on "best practices" in special education and teacher education, the SPED program has established a model program that continuously achieves regional, state, and national recognition in scholarship, teaching, and research.

Additional Admission Requirements

- 1) Official transcripts of all previous academic work attempted beyond high school documenting undergraduate GPA of 2.75 overall.
- 2) Official agency reports of satisfactory GRE or MAT test scores (30th percentile or above).
- 3) At least three evaluations from professional educators familiar with the applicant's personal and professional qualifications.

Degree Requirements

M.A.T. in Special Education (General Curriculum)

For individuals who do not hold a bachelor's degree with a major in special education.

Phase I (27 hours)

Take these courses first; they are prerequisites for courses below.

- SPED 5100 Introduction to Special Education (3)
- SPED 5173 Diagnostic Assessment (3)
- SPED 5175 Instructional Planning in Special Education (3)
- SPED 5270 Classroom Management (3)

You may take these courses next:

- SPED 5272 Teaching Mathematics to Learners with Special Needs (3)
- SPED 5275 Teaching Reading to Learners with Special Needs (3)
- SPED 5277 Teaching Writing to Learners with Special Needs (3)

- SPED 6690 Consultation and Collaboration (3)
- SPED 6475 Internship: General Curriculum (3)

Apply for Standard Professional I license in the TEAL office for admission to Phase II.

Phase II (12 Hours)

Advanced Content

- RSCH 7113 Single Case Research (3)*
- RSCH 6101 Educational Research Methods (3)
- SPED 6503 Instructional Design in Special Education (3)

** Note: If doing a research project, complete this course before SPED6691(a)*

Professional and Leadership Development (take these across three semesters)

- SPED6691a Seminar in Professional and Leadership Development (1)
- SPED6691b Seminar in Professional and Leadership Development (1)
- SPED6691c Seminar in Professional and Leadership Development (1)

Report of project/portfolio sent to the Graduate School

Application for advanced license filed in TEAL Office

M.A.T. in Special Education (Adapted Curriculum)

For individuals who do not hold a bachelor's degree with a major in special education.

Phase I (27 hours)

Take these courses first; they are prerequisites for courses below.

- SPED 5100 Introduction to Special Education (3)
- SPED 5175 Instructional Planning in Special Education (3)
- SPED 5270 Classroom Management (3)
- SPED 5271 Systematic Instruction in the Adapted Curriculum (3)

You may take these courses next:

- SPED 5273 Life Skills (3)
- SPED 5274 General Curriculum Access and Adaptations (3)
- SPED 5316 Transition Planning and Service Delivery (3)
- SPED 6690 Consultation and Collaboration (3)
- SPED 6476 Internship: Adapted Curriculum (3)

Apply for Standard Professional I license in the TEAL office for admission to Phase II.

Phase II (12 Hours)

Recommended order

- RSCH 7113 Single Case Research (3)*
- RSCH 6101 Research Methods (3)
- SPED 6502 Advanced Classroom Management (3)

** Note: If doing a research project, complete this course before SPED6691(a)*

Professional and Leadership Development (take these across three semesters)

- SPED 6691a Seminar in Professional and Leadership Development (1)
- SPED 6691b Seminar in Professional and Leadership Development (1)
- SPED 6691c Seminar in Professional and Leadership Development (1)

Report of project/portfolio sent to the Graduate School

Application for advanced license filed in TEAL Office

Admission to Candidacy Requirements

Apply no later than the announced deadline, early in the last semester of your program. Full-time students must have completed 19 hours and be enrolled for at least an additional 10 hours. Part-time students must have completed at least 31 hours.

Application for Degree

Apply no later than the announced deadline, early in the last semester of your program. Full-time students must have completed 19 hours and be enrolled for at least an additional 10 hours. Part-time students must have completed at least 31 hours.

Assistantships

The Program typically has a limited number of graduate assistantships with salaries starting at \$8,000/academic year. Applications are available from the Department of Counseling, Special Education, and Child Development (704-687-2531).

Internships

A three-hour internship is required for M.A.T. students. This internship can be done in a student's place of employment or the University can find a placement for you.

Clinicals

Most courses require students to apply the knowledge learned in classes to public/private school classrooms. Candidates who are lateral entry teachers and teacher assistants must move beyond their own classrooms and schools for at least two clinical experiences. Alternative settings must be approved by the instructor and may include schools on different schedules, summer programs, Saturday programs, private and charter schools, and homeless shelters. Employed candidates are encouraged to seek assistance and support from their administrators. A limited number of clinical experiences may be approved in *significantly different* classrooms within their school of employment.

Capstone Experiences

The capstone experience will be fulfilled by completing either a Comprehensive Portfolio (recommended) or a Master's Research Project (with approval of advisor).

Electives

There are no elective hours in The M.A.T. in Special Education.

Advising

Upon acceptance into the program all students are assigned an advisor. Students are expected to meet with their advisor each semester to discuss their coursework.

Licensure

Successful completion of Phase I will lead to an initial license and successful completion of Phase II will lead to eligibility for a North Carolina masters/advanced competencies license.

Committees

Each student will have a committee of two graduate faculty members who will provide guidance through the Capstone Experience. The committee will include the student's advisor, as well as one additional graduate faculty member chosen by the student.

Research Opportunities/Experiences

The Special Education faculty continuously achieves regional, state, and national recognition in scholarship, teaching, and research. As a result students will have multiple opportunities to become involved in practical, classroom-based research.

Tuition Waivers

A person may qualify for in-state tuition if he/she; is paid on the teacher salary schedule, has established legal residence in North Carolina, is employed full-time by a North Carolina public school, but only for "courses relevant to teacher certification or to professional development as a teacher." Contact the Residency Determination Office for further information.

Financial Aid/Financial Assistance

Information is available from the Teacher Education Advising and Licensure Office located in Room 119, College of Education. (704-687-8725)

Program Approval

The programs for both majors in the M.A.T. in Special Education have been approved by NCDPI.

GRADUATE CERTIFICATE LICENSURE PROGRAMS – SPECIAL EDUCATION

Students who hold a bachelor's degree from a regionally accredited college or university can obtain an initial North Carolina Special Education teaching license in one of two areas: General Curriculum or Adapted Curriculum.

Initial Licensure in Special Education: General Curriculum

Take these courses first; they are prerequisites for courses below.

- SPED 5100 Introduction to Special Education (3)
- SPED 5173 Diagnostic Assessment (3)
- SPED 5175 Instructional Planning in Special Education (3)
- SPED 5270 Classroom Management (3)

You may take these courses next:

- SPED 5272 Teaching Mathematics to Learners with Special Needs (3)
- SPED 5275 Teaching Reading to Learners with Special Needs (3)
- SPED 5277 Teaching Written Expression to Students with Special Needs (3)
- SPED 6690 Consultation and Collaboration (3)
- SPED 6475 Internship: General Curriculum (3)

Apply for Standard Professional I license in the TEAL office.

Initial Licensure in Special Education: Adapted Curriculum

Take these courses first; they are prerequisites for courses below.

- SPED 5100 Introduction to Special Education (3)
- SPED 5175 Instructional Planning in Special Education (3)
- SPED 5270 Classroom Management (3)
- SPED 5271 Systematic Instruction in the Adapted Curriculum (3)

You may take these courses next:

- SPED 5273 Life Skills (3)
- SPED 5274 General Curriculum Access and Adaptations (3)
- SPED 5316 Transition Planning and Service Delivery (3)
- SPED 6690 Consultation and Collaboration (3)
- SPED 6476 Internship: Adapted Curriculum (3)

Apply for Standard Professional I license in the TEAL office.

Post-Baccalaureate Admission Information

- 1) Students must have a bachelor's degree from a regionally accredited university
- 2) Complete an Application for Admission as a post-baccalaureate student through the Graduate School

Internships

A three-hour internship is required for M.A.T. students. This internship can be done in a student's place of employment or the University can find a placement for you.

Clinicals

Most courses require students to apply the knowledge learned in classes to public/private school classrooms. Candidates who are lateral entry teachers and teacher assistants must move beyond their own classrooms and schools for at least two clinical experiences. Alternative settings must be approved by the instructor and may include schools on different schedules, summer programs, Saturday programs, private and charter schools, and homeless shelters. Employed candidates are encouraged to seek assistance and support from their administrators. A limited number of clinical experiences may be approved in *significantly different* classrooms within their school of employment.

ACADEMICALLY OR INTELLECTUALLY GIFTED GRADUATE CERTIFICATE

Any teacher seeking certification in Academically or Intellectually Gifted (AIG) must first hold a general teaching license in elementary, middle school, or high school instruction. A Graduate Certificate provides a consistent, cohesive structure for teachers seeking AIG licensure that both meets the state licensure mandate and also provides maximum flexibility for later graduate study.

Requirements:

- SPED 5211 Nature and Needs of Gifted Students (3)
- SPED 6124 Methods of Instructing Gifted Students (3)
- SPED 6161 Social and Emotional Needs of Gifted Students (3)
- SPED 6224 Methods of Adapting Curriculum Materials and Classroom Differentiation (3)
- SPED 6241 Constructing Curriculum for Gifted Students (3) (*Prerequisites: SPED 5211, SPED 6124, SPED 6161, SPED 6224*)
- SPED 6270 Planning and Evaluation of Gifted Programs (3) (*Prerequisite: SPED 5211*)
- SPED 6271 Leadership in Gifted Education (3) (*Prerequisites: SPED 5211, SPED 6124, SPED 6224, SPED 6161, approval of department.*)

Admission Requirements for AIG Graduate Certificate

- 1) Students must have a bachelor's degree from a regionally accredited college or university.
- 2) Students must submit an Application for Admission to a Graduate Program.
- 3) Students must provide original transcripts that indicate a minimum overall GPA of at least 2.75.
- 4) Students must take the GRE or MAT before applying to the Special Education master's degree program.
- 5) If accepted into the master's degree program, a maximum of twelve (12) Graduate Certificate hours may be applied to the master's degree program in Special Education with the permission of the Graduate Program Coordinator and the Graduate School.
- 6) Admission to the Graduate Certificate program does not ensure admission into a master's degree program.
- 7) Students must have a teaching license in an elementary, middle, or secondary education teaching field.

COURSES IN SPECIAL EDUCATION

SPED 5000. Topics in Special Education. (1-6) May include classroom and/or clinical experiences in the content area. With department approval, may be repeated for credit for different topics. (*On demand*)

SPED 5100. Introduction to Special Education. (3) Examines the historical antecedents of contemporary practices in the field of special education and current trends in the field of education. Addresses individualized general curriculum licensing standards and adapted or individualized independence curriculum licensing standards. Examines the diversity of students with disabilities. Identifies and critiques instructional implications of published research. Field-based clinical activity required. (*Fall, Spring, Summer*)

SPED 5111. Issues in Early Intervention for Children with Disabilities. (3) Current issues and trends in early intervention and preschool services for young children with disabilities and their families. Includes site visits scheduled throughout the semester. (*Fall, Summer*)

SPED 5112. Assessment of Young Children with Disabilities: B-K. (3) Strategies for interdisciplinary educational assessment to identify needs and plan appropriate programs for young children with disabilities and their families. Approximately 20 hours of field experiences. (*Fall, Spring*)

SPED 5173. Diagnostic Assessment. (3) Prerequisite: Admitted to Teacher Education, M.A.T. (SPED), or M.Ed. (SPED); SPED 5100 pre- or co-requisite. An overview of the principles and practice of educational problem-solving with an emphasis on formal assessment, special education eligibility, linkages between assessment and instruction, and concepts in educational assessment of exceptional students.

A field-based clinical assignment of approximately 15 hours is required. (*Fall, Spring, Summer*)

SPED 5175. Instructional Planning in Special Education. (3) Pre- or corequisite: SPED 5100. Strategies for the development, implementation, and monitoring of Individualized Education Plans (IEPs) for exceptional students within the general or adapted curriculum. Through the use of technology, students are expected to demonstrate proficiency in using the general education curriculum to develop and implement IEPs and individual lesson plans for instruction. (*Fall, Spring, Summer*)

SPED 5210. Instructional Methods and Materials: The Early Years. (3) Goal-setting, instructional design, and strategies for teaching young children with disabilities and their families. Includes a field-based assignment of approximately 20 hours. (*Fall, Spring*)

SPED 5211. Nature and Needs of Gifted Students. (3) Examination of the historical and philosophical perspectives of education for gifted and talented learners with emphasis on answering the question "What is giftedness?" Issues explored in the course include identification procedures, instructional options, the nature of intelligence and creativity, laws/policies, psychological and emotional correlates of talent, and current research findings. (*Fall*)

SPED 5270. Classroom Management. (3) Prerequisites: Admission to Teacher Education, M.A.T. (SPED), or M. Ed. (SPED). Pre- or corequisite: SPED 5100. Theoretical context of positive behavioral support and related applied behavior analysis strategies, including functional behavioral assessment and intervention planning, necessary to manage effectively the classroom behaviors of individuals or groups of students with special needs and to promote success in the learning environment. A field-based clinical assignment of approximately 15 hours is required. (*Fall, Spring, Summer*)

Sped 5271. Systematic Instruction in the Adapted Curriculum. (3) Prerequisites: Admission to Teacher Education, M.A.T. (SPED), or M.Ed. (SPED). Pre- or corequisite: SPED 5100. Principles and procedures used to develop instructional support for students who need life skills and adaptations to general curriculum. Students are required to design and implement an instructional program. A field-based clinical assignment of approximately 15 hours is required. (*Fall*)

SPED 5272. Teaching Mathematics to Learners with Special Needs. (3) Prerequisites: Admission to Teacher Education, M.A.T. (SPED), or M.Ed. (SPED); SPED 5100, SPED 5173, and SPED 5175. This course will provide students with effective teaching strategies and materials in math for learners with special needs for teacher licensure in Special Education: General Curriculum (NCDPI). Assessment and application of instructional techniques are included in the course. A field-based clinical assignment of approximately 15 hours is required. (*Fall, Spring, Summer*)

SPED 5273. Life Skills. (3) Prerequisites: Admission to Teacher Education, M.A.T. (SPED), or M.Ed. (SPED); SPED 5100, SPED 5175, SPED 5271, and SPED 5270. Methods and materials for teaching functional skills in daily living, social, and vocational domains that will enable persons with special needs to live independently in their communities. Ecological assessment for life skills planning. A field-based clinical assignment of approximately 15 hours is required. (*Fall*)

SPED 5274. General Curriculum Access and Adaptations. (3) Prerequisites: Admission to Teacher Education, M.A.T. (SPED), or M.Ed. (SPED); SPED 5100, SPED 5175, SPED 5270, and SPED 5270. Strategies for developing curricular priorities for students who need adaptations to the general curriculum including ways to link to state standards in reading, math, writing, science, and other content areas. A field-based clinical assignment of approximately 15 hours is required. (*Spring*)

SPED 5275. Teaching Reading to Learners with Special Needs. (3) Prerequisites: Admission to Teacher Education, M.A.T. (SPED), or M.Ed. (SPED); SPED 5100, SPED 5173, and SPED 5175. This course will provide students with effective teaching strategies and materials in reading to learners with special needs for teacher licensure in Special Education: General Curriculum (NCDPI). Assessment and application of instructional techniques are included in the course. A field-based clinical assignment of approximately 15 hours is required. (*Fall, Spring, Summer*)

SPED 5277. Teaching Written Expression to Learners with Special Needs. (3) Prerequisites: Admission to Teacher Education, M.A.T. (SPED), or M.Ed. (SPED); SPED 5100, SPED 5173, and SPED 5175. This course is will provide students with effective teaching strategies and materials in written expression to learners with special needs. The field experience will include assessment and application of instructional techniques with students identified as receiving special education services. The course is designed to address core and specific competencies in teaching written expression to students with special needs for teacher licensure in Special Education: General Curriculum as stipulated by the North Carolina Department of Public Instruction. A field-based clinical assignment of approximately 15 hours is required. (*Fall, Spring, Summer*)

SPED 5316. Transition Planning and Service Delivery. (3) Prerequisites: Admission to Teacher Education, M.A.T. (SPED), or M.Ed. (SPED); SPED 5100, SPED 5175, SPED 5270, and SPED 5271. Methods and procedures used in preparing students with disabilities for the world of work and independence are studied. A field-based clinical assignment of approximately 15 hours is required. (*Spring*)

SPED 6000. Topics in Special Education. (1-6) May include classroom and/or clinical experiences in the content

area. With department approval, may be repeated for credit for different topics. *(On demand)*

SPED 6112. Learning Disabilities. (3) Examination of learning disabilities with emphasis on theories, issues, current trends, and definitions of learning disabilities as well as instructional strategies, program models, and major contributions to the field. *(On demand)*

SPED 6113. Mental Disabilities. (3) Examination of historical antecedents, major contributors, current practices, issues, and trends in the field of mental retardation. *(On demand)*

SPED 6114. Behavioral-Emotional Disabilities. (3) Examination of major contributors, theories, issues, current trends, and current practices in the field of behavior disorders. *(On demand)*

SPED 6122. Methods and Materials: Behavioral-Emotional Disabilities. (3) Planning, implementation, and evaluation of instructional programs with emphasis on academic and behavioral strategies, and individualization instruction for learners with behavioral-emotional disabilities. *(On demand)*

SPED 6123. Methods and Materials: Learning Disabilities. (3) Planning, implementation, and evaluation of instructional programs with emphasis on individual instruction, grouping for instruction, consultation, assessment, and program planning for learners with learning disabilities. *(On demand)*

SPED 6124. Methods of Instructing Gifted Students. (3) Prerequisite: SPED 5211. An introduction to the basic skills necessary to plan, implement, and evaluate instructional procedures that facilitate learning by gifted students. Specific theories discussed include Bloom, Bruner, Krathwohl, Parnes, Kohlberg. *(Fall)*

SPED 6161. Social and Emotional Needs of Gifted Students. (3) Prerequisite: SPED 5211. An overview of current theory and practice in understanding gifted students social and emotional development. Topics discussed in class range from the social and emotional needs of the general population of gifted students to the unique needs of specific sub-groups of gifted students (e.g., gifted girls, gifted and learning disabled, gifted minority students). *(Spring)*

SPED 6224. Adapting Curriculum Materials and Classroom Differentiation. (3) Prerequisites: SPED 5211, SPED 6124. Students study methods of making accommodations to meet the gifted students in the regular classroom. Topics include differentiated lesson plans based on national and state standards as well as methods of adapting the learning environment to support multi-level learning. *(Spring)*

SPED 6241. Constructing Curriculum for Gifted Students. (3) Models of curriculum design for academically

or intellectually gifted students. Emphasis on integrating philosophy of teacher, school, and community with child characteristics to create the appropriate course of study in a variety of school settings. *(On demand)*

SPED 6270. Planning and Evaluation of Gifted Programs. (3) Prerequisites: SPED 5211, SPED 6124, SPED 6224, SPED 6261, approval of department. Theory and practice behind structuring programs for gifted students, from legal mandates to program design and evaluation. Practice in program design using the framework presented in current North Carolina law. *(On demand)*

SPED 6271. Leadership in Gifted Education. (3) Prerequisites: SPED 5211, SPED 6124, SPED 6224, SPED 6261, approval of department. Students gain hands-on practice in advocacy and leadership at the school, district, and state levels. Activities underway at the national level review and experienced when possible. *(On demand)*

SPED 6311. Introduction to Supported Employment. (3) Introduction to the concept of supported employment including models of supported employment, social skills in the workplace, assessment, and importance of independent living skills. *(On demand)*

SPED 6321. Community-Based Instruction. (3) Prerequisite: SPED 5316. Examination of curriculum guidelines for successful supported employment programs, norm-referenced and criterion-referenced assessment, independent living skills, and social skills in the workplace. *(On demand)*

SPED 6351. Interagency Collaboration. (3) Prerequisite: SPED 5316. Analysis of existing interagency agreements and practicum experiences with individuals from agencies providing supported employment or transition services. *(On demand)*

SPED 6471. Internship: Academically or Intellectually Gifted. (3) Prerequisites: SPED 5211, SPED 6124, SPED 6641; approval of department. Supervised experiences in observation, instruction, and administration of programs with gifted and talented students. Offered only on a Pass/No Credit grading. *(On demand)*

SPED 6472. Internship: Learning Disabilities. (3) Prerequisite: permission of department. Supervised experiences in observation, instruction, and administration of programs for students with learning disabilities. Offered only on a Pass/No Credit grading. *(On demand)*

SPED 6473. Internship: Behavioral-Emotional Disabilities. (3) Prerequisite: permission of department. Supervised experiences in observation, instruction, and administration of programs for students with behavioral-emotional disabilities. Pass/No Credit grading. *(On demand)*

SPED 6474. Internship: Mental Disabilities. (3) Prerequisite: permission of department. Supervised

experiences in observation, instruction, and administration of programs for students who have mental disabilities. Offered only on a Pass/No Credit grading. (*On demand*)

SPED 6475. Internship: General Curriculum. (3)
Prerequisites: Admission to Teacher Education, M.A.T. (SPED) and grade of C or higher in all licensure courses; departmental approval. Supervised, field-based experiences in observation, instruction and administration of programs for students who have special needs. Includes on-campus seminars. (*Fall, Spring*)

SPED 6476. Internship: Adapted Curriculum. (3)
Prerequisites: Admission to Teacher Education, M.A.T. (SPED) and grade of C or higher in all licensure courses; departmental approval. Supervised, field-based experiences in observation, instruction and administration of programs for students who have special needs. Includes on-campus seminars. (*Fall, Spring*)

SPED 6502. Advanced Classroom Management. (3)
Prerequisites: Admission to Teacher Education, M.A.T. (SPED) or M.Ed. (SPED); SPED 6475 or SPED 6476 or RSCH 7113. Advanced theoretical context, including applied behavior analysis, functional assessments, and positive behavioral supports, and related applied strategies necessary to manage and maintain effectively the classroom behaviors of individuals or groups of students. A field-based clinical assignment of approximately 15 hours is required. (*Spring*)

SPED 6503. Instructional Design in Special Education. (3) Prerequisites: Admission to Teacher Education, M.A.T. (SPED) or M.Ed. (SPED); SPED 6475 or SPED 6476 or RSCH 7113. Advanced instructional design for learners who have significant difficulty in performing academic tasks with typical instruction. The course provides strategies for classroom-based assessment of individual needs using curriculum analysis, task analysis, and error analysis. It provides a framework for designing instructional sequences and error correction procedures that optimize progress. A field-based clinical assignment of approximately 15 hours is required. (*Fall*)

SPED 6630. Problems and Issues of Persons with Severe Disabilities. (3) Issues, trends, and practices in the education of persons with severe disabilities which master teachers and supervisors may encounter with this population. (*On demand*)

SPED 6640. Seminar in Special Education: Working with Families. (3) Issues and best practices in developing family-professional partnerships to support the development of persons with disabilities. Pass/No Credit grading. (*On demand*)

SPED 6641. Seminar in Curriculum Development: Gifted and Talented. (3) Procedures and suggestions for developing programs for academically or intellectually gifted learners; philosophy of the teacher; school and community

assumptions of curriculum; child characteristics; parental concerns; teaching styles. (*On demand*)

SPED 6690. Consultation and Collaboration. (3)
Prerequisite: Admission to Teacher Education, M.A.T. (SPED) or M.Ed. (SPED). The course is designed to provide graduate students an opportunity to enhance their knowledge base and expertise in consultation and collaboration with parents, general education teachers, paraprofessionals, related service personnel, and/or human service personnel. (*Fall, Spring, Summer*)

SPED 6691. Seminar in Professional and Leadership Development. (1) Prerequisites: Admission to Teacher Education, M.A.T. (SPED) or M.Ed. (SPED); SPED 6475, SPED 6476, or RSCH 7113. Design, development, and presentation of Master's Research Project or Comprehensive Portfolio. (May be repeated for credit.) (*Fall, Spring*)

SPED 6800. Individual Study in Special Education. (1-6)
Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. (*Fall, Spring, Summer*)

SPED 7999. Master's Degree Graduate Residency Credit. (1) Meets Graduate School requirement for continuous enrollment during completion of a capstone project or comprehensive examination. (*Fall, Spring, Summer*)

SPED 8271. Single Subject and Qualitative Research in Special Education. (3) In-depth study of single-subject and qualitative research methods as they apply to the field of special education including data collection, research designs, data display and analysis, and writing research reports. (*On demand*)

SPED 8471. Professional Writing in Special Education. (2) Introduces the forms of professional writing expected of leaders in special education. Emphasis is placed on critical thinking, practice writing, and peer assessment. (*Fall*)

SPED 8472. Research Implementation in Special Education. (2) The process of conducting applied research in special education. Students design and implement a research study in collaboration with a faculty member. (*Spring*)

SPED 8473. Grant Writing in Special Education. (2) An experiential course in conceptualizing and developing applications for federal, state, local, and private grant funding for research and innovation efforts. A strong emphasis will be placed on applications for federal and state funding with a secondary focus on applications for corporate and private foundation funds. (*Fall*)

SPED 8474. Supervision of Student Teachers in Special Education. (3) An internship experience. The course includes seminar sessions and concentrated practice in

supervision of special education student teachers under direct faculty supervision. (*Spring*)

SPED 8475. College Teaching in Special Education. (3) Issues and concepts in teaching adults and preparing special educators are applied in this college teaching experience. Supports students as they teach and/or co-teach university courses. May be repeated for up to 12 hours. (*Fall, Spring, Summer*)

SPED 8476. Doctoral Internship in Special Education. (3-6) Supplements students specialty areas through leadership experiences in a field related to or impacting special education (i.e., government, school district, agency). Provides students with an opportunity to explore their leadership skills in a new role within a field-based setting with the supervision of a mentor. May be repeated for up to 6 hours. (*Fall, Spring, Summer*)

SPED 8671. Doctoral Seminar in Special Education Research. (3) An intensive overview of the major research designs used in Special Education including group designs, single subject designs, survey research, qualitative research, and program evaluation. Introduces students to the research interests of the faculty. (*Fall*)

SPED 8672. Doctoral Seminar in Leadership in Special Education. (3) An intense review of the history, landmark events, professional organizations, and seminal articles in the field of special education and related disciplines. Also includes substantial coverage of federal and state policies, IDEA, and special education law. Prepares students to build professional leadership skills in areas such as time management, systematic planning, team leadership, and communication. (*Spring*)

SPED 8673. Doctoral Seminar in Diversity and Collaboration. (3) Advanced study of systems change related to educating students with disabilities who are culturally and linguistically diverse including understanding the meaning of diversity, appreciation of cultural values, principles for working with diverse families, and methods for collaboration. Addresses CEC Multicultural Standards and prepares students to develop culturally responsive instruction for schools, community, and college contexts. Enrollment limited to PhD students in Special Education. (*Fall*)

SPED 8674. Doctoral Seminar in Teaching in Special Education. (3) Presents techniques used in the supervision and instruction of adult learners in college or school system settings. Also provides an intensive overview of current, empirically supported strategies for the instruction of learners across disability areas as an important knowledge base for leadership and college teaching roles in special education. (*Spring*)

SPED 8675. Special Education Doctoral Seminar in Applied Behavioral Analysis. (3) Advanced study of concepts, principles, and strategies in applied behavioral

analysis. Prepares students in the conceptual and technical skills necessary to change socially significant behavior. (*Fall*)

SPED 8670. Advanced Research Topics in Special Education. (3) In-depth study of a topic(s) in special education research which addresses current issues in the field of special education. (*Fall, Spring, Summer*)

SPED 8699. Dissertation Proposal Seminar in Special Education. (2) Identification and definition of a research area and development of a proposal draft for an original research study appropriate for dissertation requirement. (*Summer*)

SPED 8800. Independent Study in Special Education. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. (*Fall, Spring, Summer*).

SPED 8999. Dissertation Credits. (3, 6, or 9) Development, implementation, and evaluation of an original research study that addresses the needs of exceptional learners. (*Fall, Spring, Summer*)

SPED 9999. Doctoral Degree Graduate Residency Credit. (1) Meets Graduate School requirement for continuous enrollment during completion of a dissertation. (*Fall, Spring, Summer*)

Teaching

- Master of Arts in Teaching
- Graduate Certificate in Teaching

The Master of Arts in Teaching (M.A.T.) and the Graduate Certificate in Teaching program are graduate-level pathways to teaching careers for college graduates from other fields. Both programs build on the candidate's bachelor's degree in an appropriate field as required for teacher licensure. Candidates may apply either to the Graduate Certificate in Teaching Program which leads to the issuance of a Graduate Certificate from the University and qualifies students to apply for the Standard Professional I teaching license in North Carolina or to the Master of Arts in Teaching which extends pedagogical, leadership, and research knowledge and skills. Courses completed in the Graduate Certificate in Teaching program may be applied to the Master of Arts in Teaching degree, assuming acceptance into the M.A.T. program. Candidates who are confident that they wish to complete master's-level preparation for teaching careers are encouraged to apply initially to the Master of Arts in Teaching.

Program Descriptions

Phase One of the M.A.T. has the same coursework and requirements as the Graduate Certificate in Teaching program. Candidates in either program take professional education courses and any content-specific deficiency courses required for initial licensure in their field. The culminating experience is a semester-long full-time internship in a P-12 classroom to gain supervised teaching experience in the licensure field. Successful completion of all requirements in Phase One of the M.A.T. or the Graduate Certificate in Teaching program leads to a recommendation for North Carolina initial licensure (Standard Professional I license) in the chosen field.

Students enrolled in the Graduate Certificate in Teaching program may apply to the M.A.T. at any time during or shortly after completion of coursework in their program. All graduate credits in the Graduate Certificate program are applicable to the M.A.T. when students are accepted into the full degree program. There is a six-year time limit on these graduate credits from the time of the first course to the time of graduation.

In Phase Two of the M.A.T., candidates are expected to be employed as teachers in order to conduct the required action research and leadership assignments. Successful completion of all requirements in Phase Two, coupled with two years of successful teaching, leads to a recommendation for advanced licensure in North Carolina. Advanced licensure leads to a 10% pay increment for North Carolina teachers.

Licensure Fields, Associated Departments, and Graduate Coordinators

Graduate Certificate in Teaching Program

Office of Teacher Education Advising and Licensure
Mr. Josh Avery, Licensure Advisor
704-687-8725
jdavery@uncc.edu

Elementary Education (K-6)

Department of Reading and Elementary Education
Dr. Jack Piel, Program Coordinator
704-687-8889
japiel@uncc.edu

Fine and Performing Arts (K-12)

Options: Art, Dance, Music, Theatre
Initial contact in the Office of Teacher Education
Advising and Licensure (TEAL)
Mr. Sam Nixon, Director
704-687-8811
snixon@uncc.edu

Middle Grades Education (6-9)

Options: English/Language Arts, Mathematics, Science, Social Studies
Department of Middle, Secondary, and K-12
Education

Dr. Warren DiBiase, Program Coordinator
704-687-8875
wjdibias@uncc.edu

Second Language Education (K-12)

Options: French, German, and Spanish Education
Department of Middle, Secondary, and K-12
Education
Dr. Scott Kissau, Program Coordinator
704-687-8875
spkissau@uncc.edu

Secondary Education (9-12)

Options: English, Mathematics, History/Comprehensive Social Studies, Biology, Chemistry, Comprehensive Science, Earth Sciences, Physics
Department of Middle, Secondary, and K-12
Education
Dr. Warren DiBiase, Program Coordinator
704-687-8875
wjdibias@uncc.edu

Special Education (K-12)

Options: Adapted Curriculum or General Curriculum
Department of Special Education and Child
Development
Dr. John Beattie, Program Coordinator
704-687-8772
jrbeatti@uncc.edu

Teaching English as a Second Language (K-12)

Department of Middle, Secondary, and K-12
Education
Dr. Lan Quach, Program Coordinator
704-687-8713
lquach@uncc.edu

Program Goals

Successful completion of either Phase One of the M.A.T. or the Graduate Certificate in Teaching program meets all North Carolina standards for initial licensure, called the Standard Professional I license. Successful completion of the entire M.A.T. meets all North Carolina standards for advanced licensure, called the "M" license. Those standards plus the Conceptual Framework of the College of Education provide programmatic structure so that:

By the end of the Phase One of the M.A.T. program or the end of the Graduate Certificate in Teaching program, successful candidates will be able to meet the INTASC standards required of beginning teachers:

- 1) **Content Pedagogy:** The teacher understands the central concepts, tools of inquiry, and structures of the discipline he or she teaches and can create learning experiences that make these aspects of subject matter meaningful for students.
- 2) **Student Development:** The teacher understands how children learn and develop and can provide learning

- opportunities that support a child's intellectual, social, and personal development.
- 3) **Diverse Learners:** The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners.
 - 4) **Multiple Instructional Strategies:** The teacher uses a variety of instructional strategies to encourage student development of critical thinking, problem solving, and performance skills.
 - 5) **Motivation and Management:** The teacher uses understanding of individual and group motivation and behavior to create a learning environment that encourages social interaction, active engagement in learning, and self motivation.
 - 6) **Communication and Technology:** The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.
 - 7) **Planning:** The teacher plans based upon knowledge of subject matter, students, the community, and curriculum goals.
 - 8) **Assessment:** The teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the learner.
 - 9) **Reflective Practice: Professional Growth:** The teacher is a reflective practitioner who continually evaluates the effects of his or her choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.
 - 10) **School and Community Involvement:** The teacher fosters relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well being.

By the end of the second phase of the M.A.T. program, successful candidates will be able to demonstrate the advanced competencies in their licensure fields, summarized in the following objectives:

- 1) **Educational research and assessment.** Teachers will demonstrate knowledge of, skills in, and application of educational research and assessment, including instructional modifications for diverse learners.
- 2) **Advanced pedagogy.** Teachers will demonstrate advanced levels of pedagogical knowledge and skills which involve appropriate responses to variations in students' learning needs and learning styles as well as the curriculum expectations of North Carolina.
- 3) **Advanced content knowledge.** Teachers will demonstrate advanced levels of knowledge in their academic discipline.
- 4) **Professional Growth and Leadership.** Teachers will demonstrate self-directed, self-reflective professional behavior and collaborative leadership skills that are focused on the improvement of educational practice and students' learning.

- 5) **Students' Learning.** Teachers will demonstrate a positive impact on students' learning in P-12 classrooms.

Program Requirements

The Master of Arts in Teaching requires a total of 39 hours of coursework in professional education and the content field. Elementary and special education do not have a content field requirement. The Graduate Certificate in Teaching program requires from 18 to 27 hours of coursework, depending on the licensure track.

Additional coursework in Phase One of the M.A.T. or the Graduate Certificate in Teaching program might be required to satisfy background requirements in the content field. Candidates must have the appropriate degree and specific coursework in the required competency areas within the intended content field of teaching. Candidates will be notified of any such additional requirements with their acceptance letter.

These M.A.T. and the Graduate Certificate in Teaching program respond to licensure requirements established by the North Carolina Department of Public Instruction and to recent federal guidelines established through the No Child Left Behind legislation. Because these programs are evolving, a College of Education website contains the most up-to-date information about specific programmatic and background requirements for each licensure field: <http://education.uncc.edu/mat>.

Advising

Each candidate will have an assigned advisor within the department associated with their licensure field. In the middle grades, secondary and K-12 fields, this advisor will collaborate with faculty in the appropriate department in the College of Liberal Arts & Sciences when helping candidates choose advanced coursework in those disciplines. Advising for candidates in the fine and performing arts (art, dance, music, theatre) is a shared responsibility between the College of Education and the College of Arts + Architecture; however, the initial advising contact is within the College of Education.

Licensure

At the end of Phase One, the candidate will apply for the North Carolina Standard Professional I teaching license through the Office of Teacher Education Advising and Licensure (TEAL). At the end of Phase Two, the candidate will apply for the North Carolina advanced "M" license through the Office of Teacher Education Advising and Licensure (TEAL).

Admission Requirements for the Master of Arts in Teaching

(Forms available at <http://education.uncc.edu/mat>)

- 1) A bachelor's degree from a regionally accredited college or university:

- a) For middle grades, secondary education, and K-12 education in art, dance, music, theatre, French, German, and Spanish, the bachelor's degree should have a major or equivalent in the content area of the licensure field selected.
- b) For elementary and special education, as well as Teaching English as a second language, the bachelor's degree should have strong breadth in the liberal arts associated with any major.
- 2) An undergraduate GPA of 2.75 overall and 3.0 in the junior/senior years
- 3) A score at the 30th percentile or higher on the Graduate Record Exam (GRE) or Millers Analogies Test (MAT)
- 4) A satisfactory essay providing a statement of purpose
- 5) Satisfactory recommendations from three professionals able to judge the applicant's potential for working with children and youth

Capstone Experience

M.A.T. candidates will have a choice of a comprehensive portfolio or master's research project, both of which are supported by a series of seminars in ELED, MDSK, or SPED 6691. The candidate's graduate committee will assist in the development of the final product of this capstone experience and will participate in evaluating that product according to established rubrics.

Assistantships

There are limited opportunities within the departments of the College of Education for graduate assistantships for full-time graduate students in the M.A.T. or the Graduate Certificate in Teaching program. Contact the associated departments for more information.

Admission Requirements for the Graduate Certificate in Teaching Program

(Forms available at <http://education.uncc.edu/mat>)

- 1) A bachelor's degree from a regionally accredited college or university:
 - a) For middle grades, secondary education, and K-12 education in art, dance, music, theatre, French, German, or Spanish, the bachelor's degree should have a major or equivalent in the content area of the licensure field selected.
 - b) For elementary and special education, as well as Teaching English as a second language, the bachelor's degree should have breadth in the liberal arts associated with any major.
- 2) An undergraduate GPA of 2.75 overall (Contact the Office of Teacher Education Advising and Licensure for alternative ways to demonstrate academic competence that may be used to replace this specific GPA.)
- 3) Satisfactory recommendations from three professionals able to judge your potential for working with children and youth. Lateral entry teachers may submit evidence of employment in lieu of three recommendations.

COURSES SPECIFIC TO THE MASTER OF ARTS IN TEACHING AND GRADUATE CERTIFICATE LICENSURE PROGRAMS

The courses described below are specifically designed for Phase One of the M.A.T. and the Graduate Certificate in Teaching program. Other graduate courses included in Phase Two of the M.A.T. are described with the respective M.Ed. programs, with lists of general graduate courses in Education, and in the content fields in the College of Liberal Arts and Sciences. The MAT website lists the background and program requirements for each licensure track of the M.A.T. and the Graduate Certificate program, plus the sequencing of these requirements: <http://education.uncc.edu/mat>.

Art Education Courses

ARTE 5121. Art Education Methods I (K-12). (3)
Prerequisite: Admission to MAT or Graduate Certificate in Teaching program. Analysis of learning theories as related to growth and development in visual arts; organization of tools, media and materials; curriculum design in planning art units and lesson plans; evaluation and motivation techniques. Approximately 40 hours of clinical/classroom-based field experience required. Studio/Lecture course. Six contact hours. *(Fall)*

ARTE 5122. Art Education Methods II (K-12). (3)
Prerequisites: ARTE 5121 and 3 credit hours of ARTE 6021 with a "B" or better grade. Development of objectives for art education based on personal and historical references, philosophy, and psychology. Relationship of the arts and artists to contemporary society. Curriculum design, classroom management, and approximately 40 hours of clinical/classroom-based field experience required. Studio/Lecture course. Six contact hours. *(Fall)*

ARTE 6021. Topics: Graduate Art Studio. (3)
Prerequisite: Admission to MAT Phase Two and permission of instructor. Supervised individual creative research of artistic problems in a particular discipline with appropriate documentation of resulting research. Six contact hours. May be repeated for credit. *(Fall, Spring)*

ARTE 6923. Advanced Art Education Methods. (3)
Prerequisite: Grade of B or better in ARTE 5121 and ARTE 5122, and MAT Phase Two standing. Understand and demonstrate knowledge of art education research, art content, advanced pedagogy, and leadership through selected readings, presentations, and research paper. Continue work on Master's Research Project or Master's Comprehensive Portfolio. Studio/lecture course. Six contact hours. *(On demand)*

Dance Education Courses**DANC 5227. Dance Education Methods I. (3)**

Prerequisites: Acceptance into the MAT in Dance or Graduate Certificate in Teaching program, or permission of instructor. Co-requisite: DANC 5227L. Creative movement theories; techniques and skills for teaching the elementary school child. (*Fall*)

DANC 5227L. Elementary Clinical Experience. (1)

Corequisite: DANC 5227. Observation and teaching in an elementary school setting. Application of methodologies introduced in DANC 5227. (2 contact hours) (*Fall*)

DANC 5257. Dance Education Methods II. (3)

Prerequisite: Acceptance into the MAT in Dance program or Graduate Certificate in Teaching program, or permission of instructor. Co-requisite: DANC 5257L. Experiences in techniques for teaching dance in elementary schools. (*Spring*)

DANC 5257L. Secondary Clinical Experience. (1)

Corequisite: DANC 5257. Observation and teaching in a secondary school setting. Application of methodologies introduced in DANC 5257. (2 contact hours) (*Spring*)

DANC 5400. Internship in Dance. (3) Prerequisite: Completion of all coursework required for the Standard Professional I license and instructor approval. Concepts, methods, and practices used by effective teachers in their daily classroom routines, including systematic observation skills, interpretation of observation data, and application of research-based findings. Includes visits to the teacher's classroom by university faculty. Requires a full-time, 10 to 12 week internship experience of teaching (lateral entry or student teaching) in the area for which you are seeking licensure.

DANC 6001. Topics in Dance. (3-6) Prerequisites: Admission to the M.A.T. in Dance Education Program and departmental approval. May include classroom or clinical experiences in the content area. With departmental approval, may be repeated for credit for different topics. Special emphasis in developing choreographic or creative process skills both in the classroom and for the stage. (*On demand*)

DANC 6691. Individual Projects in Dance. (3)

Prerequisites: Admission to the M.A.T. in Dance Education Program and departmental approval. Understand and demonstrate knowledge of dance education research, dance content, advanced pedagogy, and leadership through selected readings, presentations, and research paper. Continue work on Master's Research Project or Master's Comprehensive Portfolio. (*On demand*)

Elementary Education Courses

ELED 5100. Intensive Orientation to Teaching. (6) Major instructional, organizational, management, and assessment approaches within models of teaching. Theories and research about child development and diversity. North

Carolina Standard Course of Study (NCSCOS), state and local assessment programs, teacher accountability, school laws and responsibilities of teachers, teacher evaluations and high stakes accountability, and working with other stakeholders in the education process. Modern day contexts, issues, and problems of schools with reference to educational history and philosophy. Requires extensive clinical experience.

ELED 5200. Teaching Literacy. (3) Basic methodology in teaching reading and language arts, including the use of children's literature. Examination of the K-6 literacy curriculum and instructional materials with reference to developmental stages of learning and the impact of diversity in literacy instruction and curriculum integration. Emphasis on basic, effective teaching strategies and organizational patterns expected to be used in the schools. Requires extensive clinical experience.

ELED 5201. Teaching Mathematics. (3) Basic methodology in teaching mathematics from a constructivist perspective, with examination of other perspectives related to major models of teaching. Examination of the K-6 mathematics curriculum and instructional materials with reference to curriculum integration and to developmental stages of learning and the impact of diversity in mathematics instruction. Emphasis on basic, effective teaching strategies and organizational patterns expected to be used in the schools. Includes attention to prospective teachers' mathematical knowledge. Requires extensive clinical experience.

ELED 5300. Assessing, Modifying, and Integrating Literacy Instruction. (3) Assessment of student learning, evaluation of effectiveness of instruction, and modification of methods and materials for diverse learners. Closer examination of performance expectations by grade level, EOG testing, and effective instruction for struggling learners. Continued expectation for curriculum integration and use of models of teaching as an organizer for understanding instruction, assessment, and modifications. Applications of technology in literacy instruction. Design, implementation, and evaluation of literacy lessons and brief literature-focused integrated unit. Requires extensive clinical experience.

ELED 5301. Assessing, Modifying, and Integrating Mathematics Instruction. (3) Application, refinement, and expansion of pedagogical knowledge gained in the first mathematics pedagogy course, with focus upon assessment of student learning, evaluation of effectiveness of instruction, and modification of methods and materials for diverse learners. Closer examination of performance expectations by grade level, EOG testing, and effective instruction for struggling learners. Continued expectation for curriculum integration and use of models of teaching as an organizer for understanding instruction, assessment, and modifications. Applications of technology in mathematics instruction. Design, implementation, and evaluation of math lessons and brief mathematics-centered integrated

unit. Requires extensive clinical experience for non-lateral entry teachers.

ELED 5400. Teaching and Integrating Science. (3) Reviews and extends models of teaching from ELED 5100 as applied to the teaching of science. Examines the K-6 science curriculum and instructional materials with reference to curriculum integration, developmental stages of learning, and the impact of diversity in science instruction. Emphasis on basic, effective teaching strategies and organizational patterns expected to be used in the schools. Includes attention to prospective teachers' background knowledge as well as teaching competencies in all aspects of the K-6 NC science curriculum. Applications of technology in science instruction. Design, implementation, and evaluation of science lessons and brief science-centered integrated unit. Evaluation of student learning and strategies for instructional modifications for diverse learners. Requires extensive clinical experience for non-lateral entry teachers.

ELED 5401. Teaching and Integrating Social Studies. (3) Reviews and extends models of teaching from ELED 5100 as applied to the teaching of social studies. Examines the K-6 social studies curriculum and instructional materials with reference to curriculum integration and to developmental stages of learning and the impact of diversity in social studies instruction. Emphasis on basic, effective teaching strategies and organizational patterns expected to be used in the schools. Includes attention to prospective teachers' background knowledge as well as teaching competencies in all aspects of the K-6 NC social studies curriculum. Applications of technology in social studies instruction. Design, implementation, and evaluation of social studies lessons and brief social studies-focused integrated unit. Evaluation of student learning and strategies for instructional modifications for diverse learners. Requires extensive clinical experience for non-lateral entry teachers.

ELED 6470. Elementary Education Clinical Experience. (3-6) Prerequisite: completion of all coursework required for the "A" license and department approval. Application required one semester in advance. Full-time internship in an approved K-6 school setting. (*Fall, Spring*)

French, German, and Spanish Education Courses

MDSK 5200. Secondary Methods – Foreign Languages. (3) Prerequisite: Admission to the Graduate Certificate in Teaching or the Master of Arts in Teaching, and permission of the department. Current trends and practices in teaching foreign and second languages in high school, with emphasis on practical applications. Addresses state mandated competencies. Required for licensure in the teaching of French, German, or Spanish (K-12). (*Fall*)

MDSK 5201. Elementary Methods – Foreign Languages. (3) Admission to the Graduate Certificate in Teaching or the Master of Arts in Teaching, and permission of the department. Current trends and practices in teaching foreign and second languages in the elementary school and

the middle school (K-8), with emphasis on practical applications. Addresses state mandated competencies. Required for licensure in the teaching of French, German, or Spanish (K-12). (*Spring*)

LACS 6200. Advanced Methods of Teaching Foreign Languages. (3) Prerequisites: Admission to the M.A.T. in Second Language Education and completion of MDSK 6161, FORL 5200 and FORL 5201. A variety of topics will be addressed in order to prepare experienced second language teachers to be critical thinkers, second-language researchers, and instructional and program leaders. Exemplar topics include the history and trends of second language instructional methods, curriculum design, research-based practices, multicultural education, foreign language status, and mentoring of beginning teachers.

Middle, Secondary, and K-12 Education Courses

EDUC 5100. Diverse Learners. (3) Suggested prerequisite: MDSK 6162. Strategies for adapting instruction to meet the learning needs of all members of middle or secondary classrooms, including students at risk for school failure, individuals from culturally and linguistically diverse backgrounds, gifted students, and students with disabilities. Extensive clinical experience required.

ENGL 5254. Teaching English/Communications to Middle/Secondary School Learners. (3) Prerequisite: MDSK 6162. Designing integrated approaches that develop and enhance students' abilities to write, speak, listen, interpret texts, think critically, and explore new technologies. Developing rationales for integrated teaching; planning, design, and implementation of lessons, units, and course; methods of teaching a variety of genres; and other specialized concerns. Extensive clinical experience required.

MAED 5132. Teaching Math to Middle School Learners. (3) Prerequisite: MDSK 6162 and all background requirements. Preparation to teach mathematics at the middle school level with emphasis on problem solving, mathematical connections, manipulatives, cultural diversity, and assessment, including school-based field experiences. Extensive clinical experience required.

MAED 5251. Teaching Math to Secondary School Learners. (3) Prerequisite: MDSK 6162. Preparation to teach mathematics at the secondary school level with emphasis on problem solving, mathematical connections, manipulatives, cultural diversity, and assessment, including school-based field experiences. Extensive clinical experience required.

MDLG 5130. The Middle Grades Experience. (3) Current curricular and instructional programs and their impact on the learning of contemporary adolescents. Reform efforts currently underway in American schools that attempt to address issues surrounding these and other current practices. Developmental characteristics of the early adolescent learner. Extensive clinical experience required.

MDSK 5251. Teaching Science to Middle and Secondary School Learners. (3) Comprehensive overview of both science education and the nature of science. Planning and implementing effective learning experiences and assessment for both the number and the diversity of learners in a middle or secondary science classroom. Extensive clinical experience required.

MDSK 5253. Teaching Social Studies to Middle and Secondary School Learners. (3) Comprehensive overview of history and social studies education with an emphasis on providing opportunities for history and social studies teachers to create relevant, stimulating, content specific lessons for the diversity of students in middle or secondary schools. Extensive clinical experience required.

MDSK 6162. Planning for K-12 Instruction. (3) Introduction to the systematic process of planning for effective classroom instruction and assessment. Special attention will be given to the related use of technology in the development of effective and systematic learning environments. It is a recommended Prerequisite for EDUC 5100 and most of the methods courses, as you will need lesson planning skills to be successful in most of your other courses. Extensive clinical experience required.

MDSK 6470. Graduate Student Teaching and Internship. (3) Prerequisite: completion of all education coursework required for the "A" license, background requirements, and an application for the course by the established deadline; and approval of the department. Requires a full-time, semester-long graduate student teaching experience of teaching in the appropriate area of licensure. Includes formal observations in the intern's classroom by university faculty and/or school-based supervisors. Includes seminars. Application required.

READ 5255. Integrating Reading and Writing in the Content Areas. (3) Critical role of reading in learning course content in almost every subject area in the curriculum. Further, it is often the vehicle for assessing students across subjects. Methods for helping students become better readers. Extensive clinical experience required.

SECD 5140. The Secondary School Experience. (3) Overview of the developmental characteristics of the adolescent learner and their relationship to instruction. Context of American High Schools and the effects of those schools on the learning of contemporary adolescents. Reform efforts currently underway in American high schools that attempt to address some of the problems with current practice. Extensive clinical experience required.

Music Education Courses

MUED 5137. Vocal Pedagogy. (3) Prerequisite: Admission to MAT or Graduate Certificate in Teaching Program. A methodology course designed to present the physiological

and acoustical bases for a coherent approach to the teaching of singing. Areas of vocal technique to be studied include the physiology of the voice, which includes posture, breathing, onset of sound, articulation, vocal registration, and other related areas. *(Fall)*

MUED 5140. Choral Methods. (2) Prerequisite: Admission to the MAT or Graduate Certificate in Teaching Program. Corequisite: MUED 5140L. Rehearsal techniques, repertoire, and administration of school choral programs. A minimum of ten hours of field work required. Three contact hours. *(Fall)*

MUED 5140L. Choral Methods Lab (1). Corequisite: MUED 5140. Clinical application of rehearsal methods with various choral ensembles. A minimum of 10 hours in the field are required.

MUED 5151. Computer Skills for the Music Educator. (3) Prerequisites: Admission to MAT or Graduate Certificate in Teaching Program, and permission of the instructor. The study of contemporary MIDI and computer related technologies available to the music educator. Two contact hours. *(Fall)*

MUED 5194. Instrumental Methods. (2) Prerequisites: Admission to MAT or Graduate Certificate in Teaching Program, and permission of the instructor. Corequisite: MUED 5194L. Rehearsal techniques, repertoire, teaching strategies, methods, and materials of teaching and administering an instrumental music program in the public school. Two contact hours. *(Fall)*

MUED 5194L. Instrumental Methods Lab. (1) Prerequisites: Admission to MAT or Graduate Certificate in Teaching Program, and permission of the instructor. Corequisite: MUED 5194. Clinical application of rehearsal methods with collegiate and public school instrumental ensembles. A minimum of 10 hours in the field are required.

MUSC 5001. Topics in Music. (1-6) Prerequisites: Admission to MAT or MME and permission of the instructor. Special topics in music; may be repeated for credit. Specific topics courses will be field-tested and modified to become permanent courses. *(Fall, spring)*

MUSC 5170. Graduate Survey of Music History. (3) A survey of the materials of Western music and an overview of the historical development and relationships of musical styles.

MUSC 6601. Graduate Seminar in Music History. (3) Prerequisite: MUSC 5170 or permission of the department. Individual or group investigation of a selected style period, composer, genre, or topic of current interest in music history. This course provides an introduction to research methods, documentary sources, and critical analysis that will culminate in a formal research paper worthy of scholarly presentation and/or publication. *(Spring)*

Special Education Courses

See descriptions of SPED courses under Special Education.

Teaching English as a Second Language Courses

READ 6204. Teaching Reading to English Language Learners. (3) Research, theory, and instructional practices related to the reading process and reading instruction for English Language Learners in K-12 classrooms; relationship between language development and reading; examination of instructional materials including literature, basal readers, and information texts; field-based application of course content.

TESL 5103. Methods in Teaching English as a Second Language. (3) For current and future teachers of English as a Second Language (TESL) to master a variety of approaches, methods, and techniques of teaching ESL and other competencies prescribed by the State of North Carolina. (*Fall*)

TESL 5104. Authentic Assessment. (3) For current and future teachers of English as a Second Language (TESL) to develop multiple criteria assessment models as TESL diagnosticians and to master other competencies prescribed by the State of North Carolina. (*Spring*)

TESL 6204. Multicultural Education. (3) Assists teachers and other school personnel acquire skills in multicultural curriculum design and delivery. Examines issues that impede poor and minority children from reaching their full potential in today's public schools, and addresses the need to develop instructional practices that speak to their low level of attainment. Emphasizes culture and language acquisition instruction for teaching in a pluralistic society.

TESL 6470. Internship in Teaching English as a Second Language. (3) Prerequisite: Completion of all education courses and application, and permission of department. Program of experiential learning activities in an approved K-12 setting. Requires a full-time, 10 to 15 week internship experience of teaching English as a Second Language (lateral entry employment or placement with a licensed teacher). Includes formal observations in the intern's classroom by university faculty and/or school-based supervisors. (*Fall, Spring*)

Theatre Education Courses

THEA 5165. Methods of Facilitating Learning in Theatre Arts. (3) Prerequisites: Admission to the MAT or Graduate Certificate in Teaching in Theatre Education, and permission of the instructor. Exploration of pedagogical methodologies in theatre arts and the application of theory to the classroom setting. Includes instructional planning and competencies for theatre arts classes. Includes clinical experience. (*Alternate Fall*)

THEA 5400. Internship in Theatre. (3-6) Prerequisites: Admission to the MAT or Graduate Certificate in Teaching in Theatre Education, and permission of the instructor. Research and/or in-service training for theatre majors and minors in cooperating organizations. Specific content is based upon a contract between the students, department, and professional organization. (*Fall, Spring, Summer*)

THEA 5460. Practicum in Secondary School Play Production: 9-12. (3) Prerequisite: Admission to the MAT or Graduate Certificate in Teaching in Theatre Education and permission of the instructor. Study and application of advanced theories, concepts, competencies, and processes in theatre arts for teaching the specialized areas of production and performance in a secondary school setting (9-12). (*Alternate Spring*)

THEA 6001. Topics in Theatre Education. (3-6) Prerequisite: successful completion of Phase I of the MAT in Theatre. May include classroom and/or clinical experiences in the content area. With department approval, may be repeated for credit for different topics. (*On demand*)

THEA 6691. Individual Project in Theatre Education. (3) Prerequisite: successful completion of Phase I of the MAT in Theatre. Understand and demonstrate knowledge of theatre education research, theatre content, advanced pedagogy, and leadership through selected readings, presentations, and research paper. Continue work on Master's Research Project or Master's Comprehensive Portfolio. (*On demand*)

Teaching English as a Second Language

- **M.Ed. in Teaching English as a Second Language**

Department of Middle Grades, Secondary and K-12 Education

324 College of Education

704-687-8875

<http://education.uncc.edu/mdsk>

<http://education.uncc.edu/tesl>

Coordinator

Dr. Theresa Perez

Graduate Faculty

Pilar Garces-Conejos Blitvich, Assistant Professor

Charles Hutchison, Assistant Professor

Scott Kissau, Assistant Professor

Ronald F. Lunsford, Professor

Elizabeth R. Miller, Assistant Professor

Theresa Perez, Professor

David Pugalee, Professor
 Spencer Salas, Assistant Professor
 Lan Hue Quach, Assistant Professor
 Ralf Thiede, Associate Professor

MASTER OF EDUCATION IN TEACHING ENGLISH AS A SECOND LANGUAGE

The 39 hour M.Ed. Program in Teaching English as a Second Language is designed to prepare teachers to work with K-12 ESL (English as a Second Language) students. The program addresses current trends in the field by providing a balanced emphasis on the communication, cultural and linguistic features of learning English as a second language. The program requires that students hold a current "A" level or initial license in another teaching discipline to receive licensure in ESL. Individuals holding an "A" license (initial license) receive an "M" license upon the completion of the program and are prepared for teaching in public school settings.

Licensure

Students must possess an "A" level licensure in another teaching discipline to receive licensure to teach ESL and the accompanying Master's degree. Check with the Department of Middle Grades, Secondary and K-12 Education (MDSK) for the specific requirements.

Teaching English as a Second Language (Licensure)

I. Foundations (9 hours)

- ENGL 6161 Introduction to Linguistics (3)
- MDSK 6356 Curriculum Studies (3)
- RSCH 6101 Educational Research Methods (3)

II. Content Specialization (9 hours)

- ENGL 6163 Language Acquisition (3)
- ENGL 6164 Comparative Language Analysis for Teachers (3)
- ENGL 6127 Seminar in Language, Culture, and Society (3)

III. Instructional Specialization (12 hours)

- TESL 5103 Methods in Teaching English as a Second Language (3)
- TESL 5104 Authentic Assessment (3)
- TESL 6476 Advanced Pedagogy in Teaching English as a Second Language (3)
- EDUC 7126 Comparative Education (3)

(Prerequisite: Completion of Foundations, Content Specialization, and Instructional Specialization courses)

IV. Instructional Leadership (3 hours)

- MDSK 6260 Teacher Leadership (3)

(Prerequisite: Completion of Foundations, Content Specialization, and Instructional Specialization courses)

V. Electives (6 hours)

- With the assistance and approval of your advisor, choose two (2) electives. You will be assisted in selecting courses that are age/grade appropriate and reflective of your current and future work with preK-12 populations.
- A Master's research project or a Master's Comprehensive Portfolio is required
- Co-requisite requirements: One semester of a foreign language.
- All graduate courses along with the project/thesis or portfolio must be completed within a 6-year period.

Admission Requirements

Must meet all admission requirements as determined by the College of Education and the Graduate School

Internship

Required for candidates who are not currently teaching.

Master's Research Project

Students select the Master's Research Project, the Master's Thesis, or Portfolio to fulfill this requirement. Students work with a three-member faculty committee to fulfill this requirement. One of the members of the committee is the student's advisor.

Language Requirements

Show evidence of one semester of a foreign language at the college level.

Assistantships

A very limited number of assistantships are available through the Department of Middle Grades, Secondary and K-12 Education (MDSK). There may also be opportunities for teachers to work in the English Language Teaching Institute on campus.

Research Opportunities

There are numerous opportunities for students to participate in research through their courses and/or programs abroad.

COURSES IN TEACHING ENGLISH AS A SECOND LANGUAGE

TESL 5104. Authentic Assessment. (3) For current and future teachers of English as a Second Language (TESL) to develop multiple criteria assessment models as TESL diagnosticians and to master other competencies prescribed by the State of North Carolina. (*Spring*)

TESL 5103. Methods in Teaching English as a Second Language (formerly Teaching English as a Second Language). (3) For current and future teachers of English as

a Second Language (TESL) to master a variety of approaches, methods, and techniques of teaching ESL and other competencies prescribed by the State of North Carolina. *(Fall)*

TESL 6000. Topics in Teaching English as a Second Language. (1-6) May include classroom and/or clinical experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

TESL 6204. Multicultural Education. (3) Assists teachers and other school personnel acquire skills in multicultural curriculum design and delivery. Examines issues that impede poor and minority children from reaching their full potential in today's public schools, and addresses the need to develop instructional practices that speak to their low level of attainment. Emphasizes culture and language acquisition instruction for teaching in a pluralistic society. *(Fall)*

TESL 6470. Internship in Teaching English as a Second Language. (3) Prerequisite: Permission of department. Program of experiential learning activities in the student's level and/or area of academic concentration in an approved setting. *(Fall, Spring)*

TESL 6476. Advanced Pedagogy in Teaching English as a Second Language. (3) Prerequisite: Permission of department. This seminar helps students develop skills in identifying problems ESL students encounter in mainstream classrooms, ascertaining if mainstream teachers are accommodating ESL students, collaborating with other professionals in applying accommodations, and also in the application of complex instruction for the English language learners. *(Fall)*

TESL 6691. Seminar in Professional Development. (3) Seminar focused on self-direction and professional development of English as Second Language Specialists (ESL), with an increasing emphasis on becoming instructional leaders, as students plan to meet their own learning needs in instructional expertise; expand their awareness of the role of the ESL specialist; plan their program; use technology in presentations; and develop their Master's Research Project, Thesis, or Comprehensive Portfolio. *(As needed)*

TESL 6800. Individual Study in Teaching English as a Second Language. (1-6) Prerequisite: Permission of the student's advisor. Independent study under the supervision of an appropriate faculty member. May be repeated for credit. *(Fall, Spring, Summer)*

TESL 7999. Master's Degree Graduate Residency Credit. (1) Meets Graduate School requirement for continuous enrollment during completion of a research project, thesis, or portfolio. *(Fall, Spring, Summer)*

GENERAL GRADUATE COURSES IN EDUCATION

Education

EDUC 5000. Topics in Education. (1-6) May include classroom and/or clinical experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

EDUC 6000. Topics in Education. (1-6) May include classroom and/or clinical experiences in the content area. With department approval, may be repeated for credit for different topics. *(Fall, Spring, Summer)*

EDUC 6100. Theories of Human Development and Learning. (3) Concepts of development; philosophical antecedents of developmental and learning theories; role of theory in explaining human nature; components of theoretical explanations; evaluating theories. *(On demand)*

EDUC 6102. The Person and School in Urban Society. (3) The basic philosophical theories and sociocultural forces that influence the objectives, structure and programs of schools, agencies and institutions in urban society. *(On demand)*

EDUC 6254. Individualizing Instruction for Diverse Learners. (3) Instructional modifications/adaptations related to meeting the individual learning needs of students. Emphasis on teaming, collaboration, and creating a classroom environment in which all learners can be successful. Differences among learners that are influenced by development, exceptionalities, and diversity are explored using case study methodology. *(Fall, Spring, Summer)*

EDUC 6274. Contexts and Issues in the Teaching of English. (4) Prerequisites: Admission to the M.A. in English Education or the M.Ed. in Middle/Secondary Education. Examine the key concepts of the discipline. Consider own identities as readers, writers, teachers, researchers, makers of meaning. Emphasis upon critical approaches and pedagogical issues, with special attention to technology in the teaching of language, composition, and literature, as well as cultural contexts for the study of English. *(Fall) (Evenings)*

EDUC 6651. Piagetian Theory. (3) Prerequisite: Permission of the instructor. Advanced seminar for investigation of Piagetian theory with emphasis on genetic epistemology, research and neo-Piagetian concepts. *(On demand)*

EDUC 6674. Applied Research Methods in the Teaching of English. (4) Prerequisites: Completion of ENGL/EDUC

6274 and 12 hours of graduate credit toward the M.A. in English Education. Building on the research basis established in ENGL/EDUC 6274, this course provides the opportunity to apply research methods in classrooms. Examine identities as readers, writers, teachers, and especially as classroom researchers. *(Spring) (Evenings)*

EDUC 6974. Thesis/Project in the Teaching of English. (6) Research integrating the fields of English and Education in a theoretical or application-oriented study. If the thesis/project is the outgrowth of previous coursework rather than a new topic, then considerable additional research and exposition must be done. *(Fall, Spring)*

EDUC 7126. Comparative Education. (3) Analysis of sociocultural forces affecting educational planning and comparison of contemporary educational systems of selected countries and the United States. *(Spring) (Evenings)*

Research

RSCH 6101. Research Methods. (3) Identification of logical, conceptual, and empirical research problems; application of methods and procedures, including conducting library research, interpreting research findings, and preparing reviews of related literature. *(Fall, Spring, Summer)*

RSCH 6109. Assessment and Evaluation Methods. (3) Prerequisite: RSCH 6101 or equivalent. Fundamentals of individual and group assessment, including selection, administration, and interpretation of norm-referenced and criterion-referenced assessment instruments and demonstration of competencies prescribed by the State of North Carolina and other professional organizational standards. *(Fall, Spring)*

RSCH 6110. Descriptive and Inferential Statistics. (3) Prerequisite: RSCH 6101 or equivalent. Identification of objective reporting and decision-making statistics; application of descriptive and inferential methods; illustration of elementary parametric and non-parametric techniques in hypothesis testing; and, demonstration of the fundamentals of data processing. *(Fall, Spring, Summer)*

RSCH 6120. Advanced Statistics. (3) Prerequisites: RSCH 6101 and RSCH 6110 or equivalent. Application of advanced topics in probability and statistics as a basis for objective decision-making, with emphasis on the following practices through analysis of prepared data: multiple correlation and regression, one-way and n-way analysis of variance and covariance, advanced ANOVA designs, advanced non-parametric methods, and, selected multivariate statistical procedures. *(Spring) (Evenings)*

RSCH 6130. Presentation and Computer Analysis of Data. (3) Fundamentals of data presentation and analysis using computer-based statistical packages (e.g., SPSS, SYSTAT, BMDP, SAS); application of basic descriptive

statistics, correlational and associational measures, and inferential statistics emphasized in a series of analyses of prepared data; description of data sets and preparation of graphic presentations. *(Fall and Spring) (Evenings)*

RSCH 6800. Independent Study in Research. (3) Faculty-directed independent study of topics not provided by other research course offerings and/or to examine, extend, and enrich extant research knowledge through supervised individual study. *(On demand)*

RSCH 6890. Special Topics in Research. (3) Faculty-directed study and in-depth analysis of a selected area of research. *(On demand)*

Advanced Graduate Only

RSCH 7111/8111. Qualitative Research Methods. (3) Demonstration of historical, philosophical, biographical, ethnographic, and case study methods; location of information sources, application of methods of data collection and analysis, field techniques, and strategies for writing research results. *(Fall, Spring)*

RSCH 7112/8112. Survey Research Methods. (3) Prerequisite: RSCH 8210 or equivalent. Techniques of survey research, including developing proposals, addressing ethical issues, selecting direct and indirect methods, preparing questionnaires, sampling, analyzing and presenting data, writing research reports, extending applications to program evaluation. *(Fall)*

RSCH 7113/8113. Single-Case Research. (3) In-depth study of single-case research methods, including data collection, research designs, data display and analysis, and report writing. *(Spring)*

RSCH 7121. Qualitative Data Collection and Analysis. (3) Prerequisite: RSCH 7111 or permission of instructor. An advanced qualitative research methods course introducing various qualitative data collection and analysis techniques. Multiple analytic strategies are surveyed and compared from a range of social sciences. This course also provides a practical introduction to the use of computer packages for qualitative data analysis.

RSCH 7140/RSCH 8140. Multivariate Statistics. (3) Prerequisites: RSCH 8210, 8110, and 8120 or equivalent. Multiple regression, multivariate analysis of variance, discriminant function analysis, factor analysis, and other multivariate methods applied to descriptive, correlational, and experimental research problems. *(Fall)*

RSCH 7196/8196. Program Evaluation Methods. (3) Examination of principles, strategies, and techniques of program evaluation in order to identify, clarify, and apply defensible criteria that indicate a program's value, quality, utility, effectiveness, and/or significance. *(Spring)*

Doctoral Students Only**RSCH 8110. Descriptive and Inferential Statistics. (3)**

Prerequisite: RSCH 8210 or equivalent. Identification of objective reporting and decision-making statistics; application of descriptive and inferential methods; illustration of elementary parametric and non-parametric techniques in hypothesis testing; and, demonstration of the fundamentals of data processing. *(Fall)*

RSCH 8120. Advanced Statistics. (3)

Prerequisites: RSCH 8210 and 8110 or equivalent. Application of advanced topics in probability and statistics as a basis for objective decision-making, with emphasis on the following practices through analysis of prepared data: multiple correlation and regression, one-way and n-way analysis of variance and covariance, advanced ANOVA designs, advanced non-parametric methods, and, selected multivariate statistical procedures. *(Spring)*

RSCH 8121. Qualitative Data Collection and Analysis. (3)

Prerequisite: RSCH 8111 or permission of instructor. An advanced qualitative research methods course introducing various qualitative data collection and analysis techniques. Multiple analytic strategies are surveyed and compared from a range of social sciences. This course also provides a practical introduction to the use of computer packages for qualitative data analysis.

RSCH 8130. Presentation and Computer Analysis of Data. (3) Fundamentals of data presentation and analysis using computer-based statistical packages (e.g., SPSS, SYSTAT, BMDP, SAS); application of basic descriptive statistics, correlational and associational measures, and inferential statistics emphasized in a series of analyses of prepared data; description of data sets and preparation of graphic presentations. *(Fall and Spring)*

RSCH 8150. Structural Equation Modeling. (3)

Prerequisites: RSCH 8110 and RSCH 8120 or equivalent. This course is designed to apply general statistical modeling techniques to establish relationships among variables. Topics include regression models, path analysis models, exploratory and confirmatory factor analyses, latent variables, basic steps in structural equation modeling, multiple indicators and multiple causes (MIMIC) model, multi-group model, multilevel model, mixture model, structured mean model, second order factor model, latent variable growth model, and dynamic factor model. *(Spring)*

RSCH 8210. Applied Research Methods. (3) Advanced study of qualitative (e.g., Case Study, Ethnography, Grounded Theory) and quantitative (e.g., Experimental, Single Subject, Descriptive, Correlational, Causal-Comparative) research methods and evaluation research approaches. *(Summer)*

RSCH 8220. Advanced Measurement. (3) Prerequisite: RSCH 8110 or equivalent. Advanced Measurement is an overview course offered once a year and presents a wide array of higher-level information on measurement issues,

including the selection, administration and interpretation of traditional and non-traditional standardized and individually constructed tests. This course includes topics in classical and modern test theories and is intended as an overview for consumers of research.

RSCH 8230. Classical and Modern Test Theory. (3)

Prerequisites: RSCH 8110 or equivalent, RSCH 8220 or equivalent. Advanced level course applying the principles of classical and modern test theory. Topics include mathematical and statistical concepts, models, assumptions, and problems of classic test theory, basic and advanced concepts of item response theory, validity and reliability, test construction, test equating, and standard setting.

RSCH 8800. Independent Study in Research. (3) Faculty-directed independent study of topics not provided by other research course offerings and/or to examine, extend, and enrich extant research knowledge through supervised individual study. *(On demand)*

RSCH 8890. Special Topics in Research. (3) Faculty-directed study and in-depth analysis of a selected area of research. *(On demand)*



The William States Lee College of Engineering

www.coe.uncc.edu

Dean: Robert E. Johnson

Associate Dean: Ronald Smelser

Assistant Deans: Patricia Tolley, Jack Stein

The William States Lee College of Engineering at the University of North Carolina at Charlotte is known as one of the finest engineering schools in the Southeast. Emphasizing applied research in its educational programs, the college prepares students for careers in engineering through meaningful hands-on involvement and interactive teamwork. Students and faculty work with government, the private sector, and other universities to develop practical advances in technology. Locally and throughout the world, their efforts effect positive economic and environmental change. With cross-disciplinary expertise and capabilities, UNC Charlotte's renowned engineering research centers provide the tools to tackle real-world challenges in a strong academic environment. The Center for Precision Metrology, under the direction of the Department of Mechanical Engineering and Engineering Science, helps manufacturers of automobiles, airplanes, and computer chips produce perfect parts through the aid of state-of-the-art measurement systems. The Department's research programs in computational modeling and The Center for Biomedical Engineering Systems focus on improving the design, control, and manufacturing of engineered and biological systems. Faculty from the Department of Civil and Environmental Engineering are active participants in the University's Global Institute for Earth and Environmental Sustainability. Its research focus is on the environment and developing sustainable solutions that enhance the interactions of the built and natural environment. The Department, in conjunction with the Department of Geography and Earth Sciences, also assumes a key role in the Infrastructure and Environmental Systems doctoral program. The Department of Electrical and Computer Engineering takes great pride in its research at UNC Charlotte's Center for Optoelectronics and Optical Communications. There, researchers exploit the interplay

between photons and electrons in quantum confined nanostructures leading to the design, development, and fabrication of next generation optical sources and smart integrated optical devices. The Center for Lean Logistics and Engineered Systems provides industry access to the expertise of the Systems Engineering and Engineering Management faculty to remain competitive in global markets. These centers and institutes, together with the funded research programs of the faculty, support the graduate programs in Civil and Environmental Engineering, Electrical and Computer Engineering, and Mechanical Engineering and Engineering Science, as well as the Engineering Management program.

Graduate Degree Programs

- Master of Science in Engineering
- Master of Science in Civil Engineering
- Master of Science in Electrical Engineering
- Master of Science in Engineering Management
- Master of Science in Mechanical Engineering
- Ph.D. in Electrical Engineering
- Ph.D. in Infrastructure and Environmental Systems
(with the College of Liberal Arts & Sciences)
- Ph.D. in Mechanical Engineering

Civil and Environmental Engineering

- **MS in Civil Engineering (MSCE)**
- **MS in Engineering (MSE)**
- **Ph.D. in Infrastructural and Environmental Systems** (*see section on Inter-College Graduate Programs*)

Department of Civil and Environmental Engineering

136 Cameron Hall
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www.ce.uncc.edu

Graduate Director

Dr. Jy S. Wu

Graduate Faculty

James E. Amburgey, Assistant Professor
J. Brian Anderson, P.E., Associate Professor
James Bowen, Associate Professor
David M. Boyajian, Assistant Professor
Shen-en Chen, P.E., Associate Professor
John Daniels, P.E., Associate Professor
Janos Gergely, P.E., Associate Professor
Johnny Graham, P.E., Professor
Edd Hauser, Professor
Helene Hilger, P.E., Associate Professor
Hilary Inyang, Duke Energy Distinguished Professor
Rajaram Janardhanam, Professor
Martin Kane, P.E., Associate Professor and Undergraduate Director
Vincent Ogunro, Associate Professor
Srinivas S. Pulugurtha, P.E., Associate Professor
Kimberly Warren, Assistant Professor
David C. Weggel, Associate Professor
Jy S. Wu, P.E., P.H., Professor and Graduate Director
David Young, P.E., Professor and Department Chairman

Lecturers

William Saunders, P.E.
David Naylor, P.E.

P.E. = Professional Engineer
P.H. = Professional Hydrologist

Faculty Emeritus

David Bayer, Professor Emeritus
Jack Evett, Professor Emeritus
Ellis King, Professor Emeritus

Programs of Study

The Department of Civil and Environmental Engineering (CEE) provides opportunities for discipline-specific and multidisciplinary graduate-level education in civil and environmental engineering and closely related areas. Advanced course work and research are used to enhance professional development, improve technical competency, and initiate a life-long learning experience. The Department has ongoing collaborative research and student exchange programs with several international institutions.

The Department offers graduate studies leading to a master's degree (MSCE or MSE) in five areas of concentration:

- 1) Environmental and water resources engineering
- 2) Geo-environmental engineering
- 3) Geotechnical engineering
- 4) Structural engineering and structural materials
- 5) Transportation engineering

Doctoral studies leading to the Ph.D. in Infrastructure and Environmental Systems (INES) are available in an interdisciplinary, inter-college program. See the INES Program in the "Inter-College Graduate Programs" section of this *Catalog* for details.

Doctoral studies leading to the Ph.D. in Civil Engineering are also available through a cooperative arrangement with North Carolina State University (NCSSU).

MASTER OF SCIENCE IN CIVIL ENGINEERING (MSCE) AND MASTER OF SCIENCE IN ENGINEERING (MSE)

Admission Requirements

In addition to the general requirements for admission to the Graduate School, the Department of Civil and Environmental Engineering seeks the following from applicants to the Master's programs in Civil Engineering:

- An earned undergraduate degree in civil engineering for the MSCE master's program or a closely related field for the MSE master's program
- An undergraduate GPA of 3.0 or better
- A satisfactory score from the Aptitude Portion of the GRE
- Three letters of recommendation
- An acceptable TOEFL score as required by UNC Charlotte for international students
- And any other appropriate credentials as required by the Graduate School

Additional Admission Requirements

- Admission to the MSE program may require completion of certain deficiencies as required by each of the areas of concentration
- Admission to the Early Entry Program requires a minimum GPA of 3.2 and completion of at least 75 hours toward the BSCE degree.

Early Entry Program

Undergraduate students at UNC Charlotte with outstanding academic performance may be admitted to the Early Entry Program to pursue graduate study while completing the undergraduate degree requirements. Early Entry students may request two graduate civil engineering (CEGR) courses to be applied to both their graduate and undergraduate programs (double-counting).

Application Deadline

Applications for admission must be submitted online. They may be submitted any time prior to their published application deadlines. To be considered for assistantships and tuition grants for the following academic year, students should apply by February 15 because the Department makes the first round of award decisions by March 15. However, the Department will continue to evaluate applications for admission provided the application is complete for admission-consideration purposes as determined by the Graduate School.

Assistantships

Research and teaching assistantships are available from the Department on a competitive basis to highly qualified applicants/students.

Tuition Grants

Tuition grants including Non-Resident Tuition Differentials and Resident-Tuition Differentials are available on a competitive basis for both out-of-state and in-state students (respectively, North Carolina Non-Resident for Tuition Purposes and North Carolina Resident for Tuition Purposes).

Degree Requirements

A minimum of 30 approved graduate credit hours is required for graduation. At least half of the semester hours must be in courses numbered 6000 or above. A student may fulfill the 30-hour requirement by pursuing one of the three study options: (a) 24 hours of course work plus 6 hours of thesis, (b) 27 hours of course work plus 3 hours of research project, or (c) 30 hours of course work and a comprehensive examination. Each student is limited to one individual study class within the 30-hour requirement.

Admission to Candidacy Requirements

Each student is required to submit a Plan of Study to the Department's Graduate Director before completing 18 hours of graduate credits.

Upon completion of a substantial amount of graduate work, each student must file an Admission to Candidacy form to the Graduate School by the filing date specified in the University Academic Calendar.

Application for Degree

Students preparing to graduate must submit an online Application for Degree by the filing date specified in the University Academic Calendar. If a student does not graduate in the semester identified on the Application for Degree, then the student must update his/her Admission to Candidacy and submit a new Application for Degree for graduation in a subsequent semester.

Transfer Credit

The Department accepts the transfer of graduate courses (6 credits maximum) taken at another institution or from UNC Charlotte prior to admission to the master's program in civil engineering.

Core Courses

See course options for specific study tracks or areas of concentration.

Electives

Typically, two graduate courses outside CEGR or within CEGR but in a different study area may be incorporated into the 30-hour requirement. Generally, a student with a non-CEGR background is encouraged to fulfill the 30-hour requirement by all CEGR courses.

Advising

Each student is assigned an initial advisor. Upon developing a program of study, the student will be supervised by his/her graduate advisor and a program committee.

Program Committee

The Program Committee shall consist of at least three graduate faculty members. A graduate faculty from outside the Department of Civil and Environmental Engineering or from outside the student's major area-of-study may serve as a member of the Program Committee. The student's CEE graduate advisor shall chair the committee.

Capstone Experiences

Students pursuing a master's degree in Civil and Environmental Engineering have three options to complete the 30-credit hour program. Students may elect to complete 24 credit hours of coursework plus 6 credit hours of thesis; 27 credit hours of coursework plus 3 credit hours of a directed project; or 30 credit hours of coursework plus a comprehensive examination. All three options require the formation of a program committee as described above. The thesis and project options require students to submit a written thesis or project report, and orally defend their work before their program committee.

The comprehensive examination is a written exam (an oral exam may be allowed – but only under special circumstances and will require the approval of the Department Chair and the student’s advisor). A student’s exam will be scheduled when he/she has at least 24 hours of course credit completed or in progress. The student’s graduate advisor and the examining committee will coordinate the examination (typically offered once in the Fall and once in the Spring semesters), preparing the exam with the assistance of members of the student’s program committee. The exam will measure the student’s mastery of theories and applications in core courses and/or in the selected area of specialization within the discipline. Students will have only two opportunities to pass the examination.

Research Opportunity/Experience

Students in civil and environmental engineering enjoy a curriculum with opportunities for interdisciplinary research, study abroad, and active participation in a growing research program. Programs of study can be tailored to suit individual needs and interests. The CEE web site (www.ce.uncc.edu) provides current areas of research conducted by the civil and environmental engineering faculty.

Program Learning Outcomes

Students completing master’s degree will demonstrate competency in selected engineering topics at the Master’s level, and the ability to function professionally. Doctoral students will demonstrate engagement in a course of study leading to the PhD degree, competency in selected topics required for completion of research at the PhD level, knowledge of foundation subjects and specialty areas on their Plan of Study, and the ability to function professionally. These learning outcomes are consistent with expectations outlined by the University.

Track Descriptions

Required core courses for the various tracks in environmental and water resources engineering are:

Each student must complete or demonstrate competence in three of the following course areas: Hydrology and/or Hydraulics, Groundwater, Environmental Process, Site Characterization and Advanced Sustainable Design. Additional recommended courses for each study tracks are provided as follows.

Environmental Engineering: CEGR 5142 or equivalent, CEGR 5143, CEGR 6141, Water Treatment Engineering, and Chemical Fate and Transport.

Water Resources: CEGR 6141, CEGR 6146, CEGR 6147, CEGR 6149, and CEGR 6173 or equivalent.

Environmental Management: CEGR 5237 or Risk and Reliability Analysis, Natural Disasters, ISO Management

Systems, Environmental Impact Assessment, and EMGT 6902 or EMGT 6950.

Required core courses in geo-environmental engineering are:

CEGR 5145, Waste Containment Systems, Chemical Fate and Transport, and Soil and Groundwater Remediation.

Required core courses in geotechnical engineering are:

CEGR 5278, CEGR 6268, Experimental Soil Mechanics, CEGR 5270, Deep Foundation Engineering, and CEGR 5145.

Additional recommended courses in geotechnical engineering are:

CEGR 5264, CEGR 5271, CEGR 5272, CEGR 6252, CEGR 6146, Soil Improvement, and Site Characterization.

Required courses for structural engineering or structural materials are:

CEGR 5222, CEGR 5224, CEGR 5226, CEGR 5108, CEGR 6129.

Additional recommended courses for the two tracks in structural engineering are:

Structural analysis and design: CEGR 5121, CEGR 5123, CEGR 6124, CEGR 6126, CEGR 6127, CEGR 6128, Forensic Engineering, and Timber Design.

Structural materials: CEGR 6127, MEGR 6141, Composite Materials, and Structural Strengthening.

Required core courses for transportation engineering are:

CEGR 5161, CEGR 6161, and one of the following: GEOG 6100, MATH 6107, or MATH 6172.

Note: Undergraduate students who have taken any of the courses listed above, or equivalent material, as part of their undergraduate program need not take the corresponding 5000-level graduate courses. Instead, they may choose other graduate courses as a part of their master’s degree plan of study. Courses without designated course numbers are currently being offered as Special Topic classes with appropriate course numbers yet to be provided.

COURSES IN CIVIL AND ENVIRONMENTAL ENGINEERING

CEGR 5090. Special Topics in Civil Engineering. (1-4) Study of specific new areas emerging in the various fields of civil engineering. May be repeated for credit. (*On demand*)

CEGR 5108. Finite Element Analysis and Applications. (3) Prerequisite: permission of department. Finite element method and its application to engineering problems. Application of displacement method to plane stress, plane strain, plate bending and axisymmetrical bodies. Topics include but are not limited to dynamics, fluid mechanics,

and structural mechanics. Prior course work in CEGR 4224 is required. *(Spring)*

CEGR 5121. Prestressed Concrete Design. (3)

Prerequisite: permission of department. Analysis and design of prestressed components and systems, including materials and systems for prestressing, loss of prestress, flexural and shear design in accordance with current building codes, analysis of indeterminate prestressed systems, and control of camber, deflection and cracking. Prior course work in CEGR 3225 and CEGR 4224 is required. *(Spring)*
(Alternate years)

CEGR 5123. Bridge Design. (3) Prerequisite: permission of department. Review of bridge design codes and loadings; superstructure and substructure design of short, intermediate, and long span bridges constructed of steel and concrete; earthquake design; segmental and cable-stayed bridges. Prior course work in CEGR 3221 and CEGR 3225 is required. *(Spring)* *(Alternate years)*

CEGR 5128. Matrix Methods of Structural Analysis. (3)

Prerequisite: permission of department. Derivation of the basic equations governing linear structural systems. Application of stiffness and flexibility methods to trusses and frames. Solution techniques utilizing digital computer. *(On demand)*

CEGR 5141. Process Engineering. (3) Prerequisite: permission of department. Applications of material and energy balance principles to the study of chemical, biological and environmental engineering processes. Overview of applied biotechnology, engineering thermodynamics and kinetics. Prior course work in CEGR 3141 is required. *(Fall)*

CEGR 5142. Water/Wastewater Engineering. (3)

Prerequisite: permission of department. Analysis and design of water and wastewater treatment processes including: physical, chemical and biological treatment. Computer-aided design of treatment systems. Prior course work in CEGR 3141 is required. *(Spring)*

CEGR 5143. Solid Waste Management. (3) Prerequisite: permission of department. Solid waste management, sources, generation rates, processing and handling, disposal, recycling, landfill closures, and remedial actions for abandoned waste sites. Prior course work in CEGR 3141 is required. *(Spring)* *(Alternate years)*

CEGR 5144. Engineering Hydrology. (3) Prerequisite: permission of department. A quantitative study of the various components of the water cycle, including precipitation, runoff, ground water flow, evaporation and transpiration, and stream flow. Hydrograph analysis, flood routing, frequency and duration, reservoir design, and computer applications. Prior course work in CEGR 3143 is required. *(Fall)* *(Alternate years)*

CEGR 5145. Groundwater Resources Engineering. (3)

Prerequisite: permission of department. Overview of hydrological cycle. Principles of groundwater flow and well hydraulics. Regional groundwater flow and flow nets. Water chemistry and contamination. Applications of groundwater modeling. Prior course work in CEGR 3143 is required. *(Fall)*

CEGR 5146. Advanced Engineering Hydraulics. (3)

Prerequisite: permission of department. Problems of liquids as applied in civil engineering; open channel flow; dams and spillways; water power; river flow and backwater curves; pipe networks, fire flow, sewage collection, groundwater, computer applications. Prior course work in CEGR 3143 is required. *(On demand)*

CEGR 5161. Advanced Traffic Engineering. (3)

Prerequisite: permission of department. Analysis of basic characteristics of drivers, vehicles and roadway that affect the performance of road systems. Stream flow elements, volume, density, speed. Techniques of traffic engineering measurements, investigations and data analysis, capacity analysis. Intersections, accidents, parking. Prior course work in CEGR 3161 is required. *(Fall)*

CEGR 5162. Transportation Planning. (3) Prerequisite:

permission of department. Urban transportation; travel characteristics of urban transportation systems; analysis of transportation-oriented studies; analytic methods of traffic generation, distribution, modal split and assignment; traffic flow theory. Prior course work in CEGR 3161 is required. *(Spring)*

CEGR 5171. Urban Public Transportation. (3)

Prerequisite: permission of department. Planning, design, and operation of bus, rail, and other public modes. Relationship between particular modes and characteristics of urban areas. Funding, security and other administrative issues. Prior course work in CEGR 3161 is required. *(On demand)*

CEGR 5181. Human Factors in Traffic Engineering. (3)

Prerequisite: permission of department. Study of the driver's and pedestrian's relationship with the traffic system, including roadway, vehicle and environment. Consideration of the driving task, driver and pedestrian characteristics, performance and limitations with regard to traffic facility design and operation. Prior course work in CEGR 3161 is required. *(Alternate years)*

CEGR 5182. Transportation Environmental Assessment. (3)

Prerequisite: permission of department. A study of the environmental impact analysis and assessment procedures for transportation improvements. Route location decisions. Noise, air quality, socio-economic, and other impacts. *(On demand)*

CEGR 5183. Traffic Engineering Studies. (3) Prerequisite:

permission of department. Introduction to the traffic engineering studies most used by traffic engineers including

data collection techniques, statistical analysis procedures, report writing and presentation. One hour of lecture and three hours of laboratory per week. Prior course work in CEGR 3161 is required. *(Fall) (Alternate years)*

CEGR 5184. Highway Safety. (3) Prerequisite: permission of department. Engineering responses at the state and local levels to the problem of highway safety. Extent of the highway safety problem, elements of traffic accidents, common accident countermeasures, collection and analysis of accident data, evaluation of safety-related projects and programs, and litigation issues. Prior course work in CEGR 3161 is required. *(Fall) (Alternate years)*

CEGR 5185. Geometric Design of Highways. (3) Prerequisite: permission of department. Theory and practice of geometric design of highways including intersections, interchanges, parking and drainage facilities. Driver ability, vehicle performance, safety and economics are considered. Two hours of lecture and three laboratory hours per week. Prior course work in CEGR 3152 is required. *(On demand)*

CEGR 5222. Structural Steel Design II. (3) Prerequisite: permission of department. Analysis and design of structural steel components and systems with emphasis on theories necessary for a thorough understanding of the design of complete structures. Compression members affected by local buckling, beams with lateral-torsional buckling, continuous beams and beam columns are covered. Welded and bolted connections. Current AISC Specifications used. Prior course work in CEGR 3221 is required. *(Spring)*

CEGR 5224. Advanced Structural Analysis. (3) Prerequisite: permission of department. A continuation of CEGR 3122. Methods to determine deflections in structural members, including moment area, conjugate beam, virtual work, and Castigliano's theorem. Analyze statically indeterminate structures, including approximate method, slope deflection, moment distribution, and matrix stiffness methods. Project to compare analysis techniques and introduce use of structural analysis computer programs. Prior course work in CEGR 3122 is required. *(Fall)*

CEGR 5226. Reinforced Concrete Design II. (3) Prerequisite: permission of department. Analysis and design of reinforced concrete components and systems with emphasis on the fundamental theories necessary for a thorough understanding of concrete structures. Centrally loaded slender columns, slender columns under compression plus bending. Wall footings and column footings. Analysis of continuous beams and frames. Total design project involving the analysis and design of a concrete structure. Current ACI Specifications used. Prior course work in CEGR 3225 is required. *(Spring)*

CEGR 5234. Hazardous Waste Management. (3) Prerequisite: permission of department. Integration of scientific and engineering principles with legislation, regulation and technology in the management of hazardous

wastes. Study of thermal, chemical, physical and biological systems and processes used in the treatment of hazardous wastes and the remediation of hazardous waste sites. Prior course work in CEGR 3141 is required. *(On demand)*

CEGR 5235. Industrial Pollution Control. (3) Prerequisite: permission of department. Source and characterization of industrial wastewaters. Fundamentals of chemical and physical treatment processes. Biological treatment technologies. Waste minimization and reduction technologies. Sludge handling and toxicity reduction. Implementation of field or laboratory treatability study. *(On demand)*

CEGR 5237. Environmental Risk Management. (3) Prerequisite: permission of department. Review of legislation and requirements pertaining to spills and releases of chemicals to the environment. Fundamentals of fires, explosions, toxic emissions and dispersion, hazardous spills, and other accidents. Study of techniques for accident prevention and spill control, and hazardous and risk assessment. *(On demand)*

CEGR 5241. Chemical Processes in Water and Wastewater Treatment. (3) Prerequisite: permission of department. Chemical principles involved in the treatment of water and wastewaters; principles of chemical equilibrium relevant to natural water systems; the nature and effect of chemical interactions of domestic and industrial waste effluents on natural water systems. Prior course work in CHEM 1252 and CEGR 3141 is required. *(On demand)*

CEGR 5243. Topics in Environmental Health. (3) Prerequisite: permission of department. Study of contemporary environmental health problems and practices as they relate to groundwater pollution, food and water-borne diseases, radiological health, occupational health and risk assessment. Provides an introduction to epidemiology and toxicology, and a historical review of federal environmental policy and legislative action. Prior course work in CEGR 3141 and CEGR 4142 is required. *(On demand)*

CEGR 5262. Traffic Engineering. (3) Prerequisite: permission of department. Operation and management of street and highway systems. Traffic control systems, traffic flow theory, and highway capacity. Evaluation of traffic engineering alternatives and the conduct of traffic engineering studies. Prior course work in CEGR 3161 is required. *(Spring)*

CEGR 5264. Landfill Design and Site Remediation. (3) Prerequisite: permission of department. Principles of waste disposal and sanitary landfill siting including design, construction, operation and maintenance. Site assessment of underground storage tank leaks; site remediation, and clean up technologies using choice and economic analysis and computer applications. Prior course work in CEGR 3258 and CEGR 3278 is required. *(Spring) (Alternate years)*

CEGR 5270. Earth Pressures and Retaining Structures. (3)
Prerequisites: permission of the department. Lateral earth pressure theory and the effects of wall friction, external loads, groundwater, and layered soils; design procedures and construction details associated with selected rigid and modular gravity/semi-gravity walls, mechanically stabilized earth walls, and externally supported structural walls. Prior course work in CEGR 3112, CEGR 3278 and CEGR 4278 is required. CEGR 4278 can be a corequisite. *(Fall)*

CEGR 5271. Pavement Design. (3) Prerequisite: permission of department. Pavement design concepts and considerations; engineering properties of pavement materials including soils, bases, asphalt concrete, and Portland cement concrete; design of flexible and rigid pavements including shoulders and drainage; computer applications for pavement analysis and design. Prior course work in CEGR 3161 and CEGR 3278 is required. *(On demand)*

CEGR 5272. Design with Geosynthetics. (3)
Prerequisites: permission of the department. Introduction to geosynthetic materials, properties, laboratory test procedures, and functions; geosynthetic design methods used for geotechnical, transportation hydraulic, and geo-environmental applications (roadways, walls, slopes, foundation soils, landfills, and dams); the incorporation of geosynthetics for soil reinforcement, separation, filtration, drainage and containment. Prior coursework in CEGR 3258, CEGR 3278 and CEGR 4278 is required. CEGR 4278 can be a co-requisite. *(Spring)*

CEGR 5278. Geotechnical Engineering II. (3) Prerequisite: permission of department. Design of shallow and deep foundations, including structural considerations; lateral earth pressure theories; design of rigid and flexible earth retaining structures; advanced aspects of slope stability analysis; and computer applications. Prior course work in CEGR 3258 and CEGR 3278 is required. *(Spring)*

CEGR 5892. Individualized Study and Projects. (1-6)
Prerequisite: permission of department. Individual investigation and exposition of results. May be repeated for credit. *(On demand)*

CEGR 5991. Graduate Research in Civil Engineering. (1-6) Prerequisite: permission of department. Independent study of a theoretical and/or experimental problem in a specialized area of civil engineering. May be repeated for credit. *(On demand)*

CEGR 6090. Special Topics in Civil Engineering. (1-6)
Prerequisite: permission of department. Directed study of current topics of special interest. May be repeated for credit. *(On demand)*

CEGR 6122. Advanced Topics in Structural Steel. (3)
Prerequisite: permission of department. Theory of plastic-behavior of steel structures; current topics in structural steel. Prior course work in CEGR 4222 is required. *(On demand)*

CEGR 6124. Masonry Design. (3) Prerequisite: permission of department. Introduction of masonry materials and systems, engineering and materials properties and testing procedures. Design of reinforced and unreinforced masonry (clay and concrete) walls, beams, and columns for vertical, wind, and seismic loads. Analysis and design of masonry structures and introduction to computer applications. Prior course work in CEGR 3225 is required. *(Spring) (Alternate years)*

CEGR 6126. Analysis of Plates and Shells. (3) Prerequisite: permission of department. Analysis of rectangular and circular plates using classical as well as numerical methods; orthotropic and continuous plates and plate buckling. Analysis of thin shells and shells of revolution with and without bending; membrane theory of cylindrical shells; symmetric and unsymmetric loading; pipes, tanks, and pressure vessels; computer applications. Prior course work in CEGR 4224 is required. *(On demand)*

CEGR 6127. Fracture Mechanics and Fatigue. (3)
Prerequisite: permission of department. Introduction to fracture mechanics and fatigue, including Griffith Theory, plane strain-stress conditions, critical stress intensity factors, factors influencing fracture toughness, fracture mechanics design principles, fatigue performance, and fatigue initiation and propagation. Prior course work in CEGR 3221 is required. *(On demand)*

CEGR 6128. Structural Optimization. (3) Prerequisite: permission of department. Introduction to optimization concepts; reformulation of common structural analysis and design problems to an optimization format; optimization of constrained, unconstrained, linear, and nonlinear problems by classical and numerical techniques; and computer applications. Prior course work in CEGR 4224 is required. *(On demand)*

CEGR 6129. Structural Dynamics. (3) Prerequisite: permission of department. Methods for dynamic analysis of single and multiple degree of freedom systems. Topics include free vibrations, dynamic response of simple structures under time dependent loads (e.g., harmonic, periodic, impulsive, general dynamic loading), support motion, frequency domain analysis, response spectra, earthquake engineering. Prior course work in CEGR 3122 is required. *(On demand)*

CEGR 6141. Water Quality Modeling. (3) Prerequisite: permission of department. Mathematical modeling of water quality in receiving streams including: generation of point and nonpoint sources of pollution; formulation of transport equations for contaminants in stream and estuarine water; and prediction of the fate, persistence and transformation of

chemical pollutants in aquatic ecosystems. Computer model simulation and case studies. (*On demand*)

CEGR 6142. Bioenvironmental Engineering. (3)

Prerequisite: permission of department. Theoretical principles and design of aerobic and anaerobic biological unit processes for renovating waters and wastewaters. Activated sludge, aerated and facultative lagoons, rotating biological contractors, trickling and anaerobic filters. Prior course work in CEGR 3141 is required. (*On demand*)

CEGR 6144. Environmental Biotechnology. (3)

Prerequisite: permission of department. Application of biotechnology to the management of environmental problems. Study of bioprocess principles, bioremediation of waste disposal sites, cell immobilization technology and innovative biotechnologies. (*On demand*)

CEGR 6145. Waste Incineration. (3) Prerequisite: permission of department. Fundamentals of incineration of hazardous/solid wastes. Thermochemical applications and equipment design. Computer modeling of the incineration process and air quality control. (*On demand*)

CEGR 6146. Advanced Groundwater Analysis. (3)

Prerequisite: permission of department. Modeling of groundwater flow in saturated and unsaturated zones. Contaminant transport including advection, dispersion and numerical modeling. Groundwater remediation technology. (*Alternate years*)

CEGR 6147. Watershed Modeling. (3) Prerequisite:

permission of department. Characterization of non-point source pollution; modeling of flow and pollutant transport in storm runoff. Watershed modeling in a GIS environment including applications of SWIMM, BASINS, HEC-HMS, HEC-RAS, and NRCS models. (*Spring*)

CEGR 6148. Water Conservation. (3) Prerequisite:

permission of department. Principles and issues concerning water conservation and methods for effecting water conservation, including residential, industrial, commercial, and agricultural water conservation; water rates, audits and reuse/reclamation as they relate to water conservation; and case studies. (*On demand*)

CEGR 6149. Watershed Analysis. (3) Prerequisite:

permission of department. Study of NPS problems in urban and non-urban watersheds and from highway runoff. Estimate of sediment yield and design of BMP's including sediment control structures. Introduction to monitoring and modeling of hydrologic systems. Watershed modeling in a GIS environment. (*Fall*)

CEGR 6161. Traffic Control and Operation. (3)

Prerequisite: permission of department. Traffic control theory and application; traffic regulation, laws and ordinances; speed control, intersection control, flow control and parking control; design and application of control devices, investigation, evaluation techniques; statistical

analysis; administration. Prior course work in CEGR 5161 is required. (*Spring*)

CEGR 6165. Urban Systems Engineering. (3) Prerequisite: permission of department. Survey of economic, political, sociological and technological factors affecting modern growth; a planning process and its role in solving selected urban problems with emphasis on engineering contributions. Prior course work in CEGR 3202 is required. (*On demand*)

CEGR 6171. Air Quality Control. (3) Prerequisite:

permission of department. Study of various types of air pollutants, their sources, nature and effects. Examination of air quality criteria, standards and monitoring. Analysis of feasibility, applicability and efficiency of diverse systems of control. Evaluation of goal and research needs in the future. (*On demand*)

CEGR 6172. Air Dispersion Modeling. (3) Prerequisite: permission of department. Atmospheric pollution problems, federal regulations, boundary layer meteorology, dispersion theory, Gaussian model, plume rise formulas, air toxics, and computer modeling of point area, line and mobile sources. (*On demand*)

CEGR 6173. Environmental Aquatic Chemistry. (3)

Prerequisite: permission of department. Concepts of chemical equilibrium applied to natural aquatic systems. Topics include acid-base reactions, buffer systems, mineral precipitation, coordinate chemistry, redox reactions, adsorption phenomena and chemical-equilibria computer programs. Prior course work in CHEM 3111 or CHEM 3141 or equivalent is required. (*Spring*) (*Alternate years*)

CEGR 6181. Traffic Flow Theory. (3) Prerequisite:

permission of department. Logical foundations and mathematical representation of traffic flow; interrelation between microscopic and macroscopic equations of motion for highway traffic; stochastic properties of traffic at low and moderate densities. Car-following theories of traffic flow at high densities. Applications of queuing theory. Prior course work in CEGR 5161 is required. (*On demand*)

CEGR 6182. Transportation Systems Analysis. (3)

Prerequisite: permission of department. Issues, concepts and methods of transportation systems engineering and planning. Decision making in transportation management. The application of analytical methods to the development and evaluation of transport systems. Prior course work in CEGR 5161 is required. (*On demand*)

CEGR 6252. Soil Dynamics and Earthquake Engineering. (3)

Prerequisite: permission of department. Review of the dynamics of single and multi degree of freedom systems. Earthquake mechanism, distribution, magnitude, intensity, ground shaking, site effects, prediction, and response spectra. Soil liquefaction; aseismic design of foundations; seismic codes; and machine foundation design. Prior course

work in CEGR 3122 and CEGR 3278 is required. (*On demand*)

CEGR 6261. Traffic Signal Control Systems. (3)
Prerequisite: permission of department. Study of control systems for isolated intersections, arterial streets, closed networks, and freeways. Emphasis on computer models; state-of-the-art detection, control, and communications equipment and software; and intelligent vehicle/highway systems. Prior course work in CEGR 6161 is required. (*Fall*)

CEGR 6268. Advanced Soil Mechanics. (3) Prerequisite: permission of department. One and two-dimensional consolidation, layered strata effects, and creep; seepage in layered strata, flow net, and seepage forces; shear strength parameters, effective and total stress paths, and application for slope stability evaluation; principles of critical state soil mechanics; computer applications. Prior course work in CEGR 3258 and CEGR 3278 is required. (*Fall*)

CEGR 6892. Individualized Study and Projects. (1-6)
Prerequisite: permission of department. Individual investigation or exposition of results for the 3-hour MS project. May be repeated for credit. (*Fall, Spring, Summer*)

CEGR 6990. Industrial Internship. (1-3) Prerequisite: Completion of nine hours of graduate coursework. Full- or part-time academic year internship in engineering complementary to the major course of studies and designed to allow theoretical and course-based practical learning to be applied in a supervised industrial experience. Each student's program must be approved by their graduate program director and requires a mid-term report and final report to be graded by the supervising faculty. Grading shall be designated as "Pass/Unsatisfactory" and credit hours gained from Internship shall not be part of the minimum credit hours requirement for graduation. (*On demand*)

CEGR 6991. Graduate Master Thesis Research. (1-6)
Prerequisite: permission of department. Individual investigation culminating in the preparation and presentation of a thesis. May be repeated for credit. (*Fall, Spring, Summer*)

CEGR 7999. Master's Degree Graduate Residency Credit. (1) Required for continuing registration and enrollment while completing thesis or research project. May be repeated. (*Fall, Spring, Summer*)

CEGR 8090. Special Topics. Directed study of current topics of special interest. (*See the INES Program in the Inter-College Graduate Programs Section of this Catalog for details.*)

Electrical Engineering

- **Ph.D. in Electrical Engineering**
- **M.S. in Electrical Engineering (MSEE)**
- **M.S. in Engineering (MSE)**

Department of Electrical and Computer Engineering

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Robert Cox, Assistant Professor
Kasra Daneshvar, Professor
Michael Fiddy, Professor
Mohamed-Ali Hasan, Associate Professor
Ivan Howitt, Associate Professor
Eric Johnson, Professor
Bharat Joshi, Assistant Professor
Vasilije Lukic, Professor
Mehdi Miri, Associate Professor
Arindam Mukherjee, Assistant Professor
Asis Nasipuri, Associate Professor
Arun Ravindran, Assistant Professor
Ron Sass, Associate Professor
Ed Stokes, Associate Professor
Farid Tranjan, Professor
Raphael Tsu, Professor
Tom Weldon, Associate Professor
Andrew Willis, Assistant Professor
Jiang (Linda) Xie, Assistant Professor

The Department of Electrical and Computer Engineering offers multidisciplinary programs leading to M.S. and Ph.D. degrees in Electrical Engineering. The department offers a first class education to its students which prepare them for positions in industry or academia. Our students are provided with both breadth of knowledge in Electrical and Computer Engineering and related areas and depth of knowledge in the chosen research specialty. The department is staffed with a prestigious faculty conducting research in areas ranging from control systems to optoelectronics. A full range of state-of-the-art laboratories is available enabling

faculty and students to conduct research at the cutting edge of technology.

PH.D. IN ELECTRICAL ENGINEERING

The Ph.D. program is designed to provide the students with research-level expertise in a focus area within electrical and computer engineering and breadth of knowledge in areas related to the focus area. In addition to taking a set of courses in a chosen area of concentration, a key aspect of the doctoral degree is the student's research dissertation. Each dissertation is expected to be a significant original contribution on research on a chosen subject, which usually leads to one or more archival publications. Successful doctoral students develop the aptitude and confidence for generating new knowledge and practices in academic, industrial, and governmental environments.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the Electrical and Computer Engineering department seeks the following from applicants to the Ph.D. program in Electrical Engineering:

- 1) A master's degree in electrical and/or computer engineering or a closely allied field, demonstrating strong academic background for performing research in a chosen area of interest. Exceptional students with only a baccalaureate degree who are motivated to pursue a Ph.D. may also be considered for direct admission to the Ph.D. program.
- 2) The applicant must receive satisfactory scores on the quantitative and verbal sections of the Graduate Record Examinations General Test.
- 3) The statement of purpose, written by the applicant, must specify the applicant's research interests within Electrical and Computer Engineering.

Degree Requirements

The following is a chronologically ordered set of requirements for the Ph.D. degree in Electrical Engineering:

- 1) Appointment of a Ph.D. advisor and formation of an advisory committee.
- 2) Development of a Ph.D. Plan of Study detailing all course and examination requirements.
- 3) Successful completion of the qualifying examinations.
- 4) Presentation of a proposal for Ph.D. research and admission to candidacy.
- 5) Successful defense of the Ph.D. Dissertation.

Within the first semester of being admitted into a Ph.D. program, the student should choose a Ph.D. advisor and form an advisory committee. In conjunction with the Ph.D. advisor and this advisory committee, the student will develop a Plan of Study to meet the Ph.D. program requirements of course work and examinations and prepare

to undertake original research leading to a doctoral dissertation. Normally, a student would be expected to have at least one archival publication on the research performed for the dissertation.

Plan of Study

The Plan of Study must be submitted to the Director of Graduate Programs for review and approval within the second semester of enrollment in the Ph.D. program. The Plan of Study must show a minimum of 72 hours of credit beyond the Baccalaureate degree, including 18 hours of doctoral dissertation credits. At least 12 hours of course work must be taken after admission to the Ph.D. program. The specific course requirements will be set by the student's Advisory Committee. Doctoral students should take 8000-level courses when they are available. 6000 and 5000 level graduate courses that do not have 8000-level counterparts may also be counted towards the doctoral degree if approved by the Advisory Committee. For students who do not possess bachelor's and/or master's degrees in appropriate fields of study, additional course work may be required. Courses taken without the approval of the advisory committee may not be counted toward the degree.

Grades

A student must have a GPA of at least a 3.0 in order to graduate. The dissertation is graded on a Pass/No Credit basis and, therefore, will not be included in the cumulative GPA. An accumulation of more than two marginal (C) grades will result in suspension of the student's enrollment in the graduate program. If a student makes a grade of U on any course, enrollment will be suspended. A graduate student whose enrollment has been suspended because of grades is ineligible to attend any semester or summer session unless properly readmitted to the graduate program. Readmission to the program requires approval of the Dean of the Graduate School upon the recommendation of the student's major department.

Residence

A student may satisfy the residency requirement for the program by completing 18 hours, either course work or research credits, by study-in-residence during the academic year and during the summer terms, as long as the study is continuous. Study-in-residence is deemed to be continuous if the student is enrolled in one or more courses (including research/dissertation credit) in successive semesters until eighteen hours of credit are earned.

Qualifying Examination

In addition to demonstrating a high level of competence in course work, the student must pass the Ph.D. qualifying examinations. The qualifying examination should be taken before completion of 24 hours beyond the master's degree but must be passed no later than four semesters after initial enrollment in the program. Failure to pass the qualifying examination after two attempts will result in the termination of the student's enrollment in the Ph.D. program.

The qualifying exam is divided into two test sessions. The first session covers primarily senior level undergraduate courses, and the second session covers primarily graduate courses in ECE. While the first session covers the breadth areas of electrical and computer engineering, the second session is focused on the students area of concentration. For a detailed listing of courses, areas, and procedures for the Ph.D. qualifying examinations in electrical and computer engineering please contact the ECE department, or go to department's website at www.ece.uncc.edu.

Dissertation Proposal and Admission to Candidacy

Because the Ph.D. program is heavily based on independent research, each student must write a proposal describing his/her proposed dissertation research following the technical guidelines established by the department. The proposal must be presented to and orally defended before the student's advisory committee. The proposal must be presented within one year after the qualifying examination is passed. Upon approval of the student's dissertation proposal, the advisory committee will recommend the student's admission to candidacy subject to the approval of the Engineering Doctoral Graduate Committee and the Dean of the Graduate School. It is the responsibility of the student to file the Admission to Candidacy form to the Graduate School by the filing data specified in the University Academic Calendar.

Dissertation

Evidence of a high degree of competence in scholarship, written exposition, independent inquiry and the ability to organize and apply knowledge must be demonstrated by the student in the dissertation. The student will make a public defense of the dissertation at which time the dissertation, as well as the student's knowledge of the field, will be appropriate matter for examination by the student's advisory committee. Although questions may be asked by the general audience, evaluation of the dissertation defense is the sole responsibility of the advisory committee. The dissertation will be graded on a Pass/Unsatisfactory basis.

Application for Degree

Students preparing to graduate must submit an online Application for Degree by the filing date specified in the University Academic Calendar. If a student does not graduate in the semester identified on the Application for Degree, then the student must update his/her Admission to Candidacy and submit a new Application for Degree for graduation in a subsequent semester.

Time Limit

Students are allowed a maximum of eight (8) calendar years from formal admission to the Ph.D. program to complete the program successfully.

Assistantships

There are two forms of assistantships that are offered by the ECE Department. These are Teaching Assistantships (TAs)

and Research Assistantships (RAs). RAs are controlled by faculty members with research grants, and the faculty members make the decisions in selecting students for RAs. Therefore, for RAs, students should contact individual faculty members directly. TAs are given to students to help faculty members with classroom teaching or laboratory instruction and these allocations are related to the ECE department needs and available resources. In all cases, the TAs and RAs are awarded to exceptional students. Application forms are available on the ECE and Graduate School Web sites.

Tuition Waivers

For exceptionally qualified candidates who are awarded TAs or RAs, in state tuition and out-of-state tuition support may be available (Resident/Non-Resident Tuition Differential).

MASTER'S PROGRAMS IN ELECTRICAL ENGINEERING

The Master's programs are designed to provide technical expertise in a specific area of electrical and computer engineering as well as breadth of knowledge in supporting areas. The thesis option provides the students the opportunity to work on a research project that culminates in the publishing of a thesis. The non-thesis option is designed to provide additional breadth in areas that support the chosen focus area. It is also the goal of the program to graduate engineers with effective problem solving and communication skills.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the Department of Electrical and Computer Engineering seeks the following from applicants to the Master's programs in Electrical Engineering:

Applicants should have baccalaureate degrees in electrical and/or computer engineering with a GPA of at least 3.0 out of 4.0. Applicants must have satisfactory scores in the quantitative and verbal sections of the Graduate Record Examinations general test.

Applicants with baccalaureate degrees in fields closely related to electrical and computer engineering (e.g., electronics, computer science, mathematics, physics, etc.) may also be considered. If admitted, these applicants may be required to take additional courses beyond their Master's course requirements, as determined by the Graduate Program Director.

Admission is based on the overall background, motivation, and potential, as determined by the department.

Early Entry to the Graduate School

Exceptional undergraduate students of UNC Charlotte may be accepted into the graduate program and begin work towards a graduate degree before completion of their baccalaureate degree. An early entry student may take up to

six hours of graduate course work that will be counted towards his/her undergraduate hours and also towards his/her graduate degree, i.e., up to six credits of graduate course work may be “double counted” for both baccalaureate and graduate degrees.

An applicant may be accepted at any time after completion of 75 or more hours, although it is expected that close to 90 hours will have been earned by the time the first graduate course is taken. To be accepted into this program, an undergraduate student must have an overall GPA of at least 3.2 and have earned satisfactory scores in the Graduate Record Examinations general tests. If any early-entry student does not meet the normal admission requirements of a 2.75 overall undergraduate GPA and a 3.0 junior-senior GPA at the end of his/her baccalaureate degree, he/she will be dismissed from the graduate program.

M.S.E.E. Degree Requirements

The M.S.E.E degree is awarded to those students who complete the M.S. program of the Department of Electrical and Computer Engineering. Students admitted to the M.S. program who do not have a B.S. degree in electrical or computer engineering or related field, may need to take undergraduate preparatory courses in order to succeed in their graduate studies.

Thesis and Non-Thesis Options

Students may pursue either the thesis or non-thesis option for a Master’s degree in Electrical Engineering. In the thesis option, the student must complete 9 hours of thesis research. Alternatively, the student may complete the requirements of a Master’s degree under the non-thesis option by taking 30 credits of course work only, or by taking 27 credits of course work along with three credits of individualized project work.

Degree Requirements for the Thesis Option

- 1) Plan of Study - the student must meet with his/her advisor to formulate a plan of study. The plan of study must be submitted after completing at least 9 but no more than 18 semester credits.
- 2) Satisfactory completion of 30 hours of approved graduate credits in major or related area of study including 9 hours of thesis.
- 3) Not more than 6 credits may be taken from outside the electrical and computer engineering department.
- 4) Admission to candidacy - the Admission to Candidacy form must be completed prior to the thesis defense. The student should consult the schedule of classes for deadlines on submitting this form for fall or spring graduation.
- 5) Thesis Defense - a copy of the thesis should be distributed to each member of the program committee at least two weeks prior to the defense. The student should make a public announcement of the defense within the department to allow attendance by interested faculty members and students of electrical and computer engineering.

Degree Requirements for the Non-Thesis Option

- 1) Plan of Study - the student must meet with his/her advisor to formulate a plan of study. The plan of study must be submitted after completing at least 9 but no more than 18 semester credits.
- 2) Satisfactory completion of 30 hours of approved graduate credits. At least 21 hours of courses must be in the ECE department.
- 3) A student may take up to three credits of individualized project that will require a written report and an oral presentation. Alternately, the student may take all 30 credits of course work.
- 4) Admission to candidacy - the admission to candidacy form must be completed prior to the oral exam. The student should consult the schedule of classes for deadlines on submitting this form for fall or spring graduation.
- 5) The student must pass a written exam (for course work only) or an oral exam/presentation (for project) that will be administered by the program advisory committee.

Program Committee

The program committee is composed of at least 3 members of the graduate faculty, the majority of whom must be members of the Electrical and Computer Engineering department. The graduate program advisor generally serves as the chairman of the committee.

Admission to Candidacy Requirements

Each student must file an Admission to Candidacy Form to the Graduate School by the filing date specified in the University Academic Calendar.

Application for Degree

Students preparing to graduate must submit an online Application for Degree by the filing date specified in the University Calendar. If a student does not graduate in the semester identified on the Application for Degree, then the student must update his/her Admission to Candidacy and submit a new Application for Degree for graduation in a subsequent semester.

COURSES IN ELECTRICAL AND COMPUTER ENGINEERING

ECGR 5101. Embedded Systems. (3) Prerequisite: ITCS3182, ECGR3183, or equivalent. Introduction to designing microcontroller-based embedded computer systems using assembly and C programs. Examination of real-time operating systems and their impact on performance. Computer engineering applications will be emphasized. Credit will not be given for ECGR 5101 where credit has been given for ECGR 4101. (*Fall*)

ECGR 5102. Engineering Simulation. (3) Prerequisite: ECGR 2103 or equivalent. A wide range of simulation related topics will be introduced including the theory of simulation, characteristics of simulators, and trade-offs in simulation studies. Continuous and discrete simulation with primary emphasis on application of simulation techniques to engineering problems. Simulation of actual problems based on students' interest and experience areas. Credit will not be given for ECGR 5102 where credit has been given for ECGR 4102. *(On demand)*

ECGR 5103. Applied Computer Graphics. (3) Interactive graphics; raster, character, vector, graphics, display technologies; rotation, scaling, translating of graphics image; image processing/enhancement; feature extraction; 3-D graphics; hidden lines. Credit will not be given for ECGR 5103 where credit has been given for ECGR 4103. *(On demand)*

ECGR 5104. Computational Methods in Power Systems. (3) Prerequisite: ECGR 4142 or equivalent. Numerical techniques for analysis, operation and planning of power systems. Sparse matrix techniques applied to power flow algorithms. Economic operation of power systems. Optimum power flow. Credit will not be given for ECGR 5104 where credit has been given for ECGR 4104. *(On demand)*

ECGR 5111. Control Systems. (3) Prerequisite: permission of instructor. Mathematical models and characteristics of control systems. Performance and stability of linear feedback systems. Root locus and frequency response techniques. Stability in frequency domain. Time domain analysis. Design and compensation of control systems. Credit will not be given for ECGR 5111 where credit has been given for ECGR 4111. *(Fall) (Evenings)*

ECGR 5112. Nonlinear Analysis. (3) Prerequisite: ECGR 3111 or equivalent. Solution of nonlinear problems using numerical and graphical methods, phase plane plots, analysis of singular points and analytical techniques. Forced oscillating systems. Stability of nonlinear systems. Use of analog and digital computer to study nonlinear problems. *(On demand)*

ECGR 5113. Network Synthesis. (3) Prerequisite: ECGR 4113 or equivalent. The positive real concept, properties and methods of testing. Realizability conditions on driving point functions. Methods of synthesis of one-port. Physical realizability and properties of two-port networks. Transfer function synthesis. Approximation methods. Credit will not be given for ECGR 5113 where credit has been given for ECGR 4183. *(On demand)*

ECGR 5114. Device Characterization, Parameterization and Modeling. (3) Prerequisites: ECGR 3132 and ECGR 4134 or their equivalents. Advance device and circuit analysis; device and circuit simulation using SPICE, ECAP or equivalent. Parametric modeling of active devices. Device characterization and parameterization; temperature effects;

thermal cycling. Analysis of device failure modes. Credit will not be given for ECGR 5114 where credit has been given for ECGR 4184. *(On demand)*

ECGR 5121. Antennas. (3) Prerequisite: ECGR 3122 or equivalent. Radiation into free space, the point source, thin linear antenna, arrays of linear elements, aperture antennas, impedance, methods of feeding, matching and termination. Antenna systems. Credit will not be given for ECGR 5121 where credit has been given for ECGR 4121. *(On demand)*

ECGR 5122. Random Processes and Optimum Filtering. (3) Prerequisites: ECGR 3111 and STAT 3228 or their equivalents. Review of probability, univariate and multivariate distribution functions; random processes, discrete and continuous time processes, wide-sense stationary, ergodicity; time- and frequency-domain analysis; linear systems, optimum filtering, Wiener filters, Kalman filters; application. Credit will not be given for ECGR 5122 where credit has been given for ECGR 4422. *(Spring)*

ECGR 5123. Advanced Electromagnetic Field Theory. (3) Prerequisite: ECGR 3122 or equivalent. Maxwell's equations and propagation. Properties of guided and surface waves. Wave properties of light; physical and fiber optics. Credit will not be given for ECGR 5123 where credit has been given for ECGR 4185. *(On demand)*

ECGR 5124. Digital Signal Processing. (3) Prerequisite: ECGR 3111 or equivalent. Sampling and signal recovery in linear systems; analysis of sampled systems; discrete and fast Fourier transforms; z-transform; discrete convolution; design of digital FIR and IIR filters. Credit will not be given for ECGR 5124 where credit has been given for ECGR 4124. *(Spring)*

ECGR 5125. Foundations of Optical Engineering I. (3) Prerequisites: ECGR 3121 (Electromagnetic Fields) and PHYS 3141 (Modern Physics) with a grade of C or better or permission of department. The engineering aspects and applications of modern optics, optical communications, optical materials, optical devices, basic optical fiber and integrated optics, optical signals, and optical modulation, multiplexing, and related networks, basic Fourier optics and its application in optical images and information. Credit will not be given for ECGR 5125 where credit has been given for ECGR 4125. *(Fall)*

ECGR 5132. Analog Integrated Circuit Design. (3) Prerequisite: ECGR 4131 or equivalent. Topics include analog MOS modeling, design of current mirrors, references, and operational amplifiers. Both hand analysis and SPICE simulation utilized. Credit will not be given for ECGR 5132 where credit has been given for ECGR 4132. *(Spring)*

ECGR 5133. VLSI Systems Design. (3) Prerequisite: ECGR 2181 and 3131 or their equivalents. Analysis, design, and synthesis of very large scale integrated circuits. A project-oriented course relying heavily on computer-aided

design tools for logic, layout design, and simulation. Credit will not be given for ECGR 5133 where credit has been given for ECGR 4433. *(Fall) (Evenings)*

ECGR 5134. Advanced VLSI Systems Design. (3)

Prerequisite: ECGR 5133 or permission of department. A project-oriented course dealing with advanced topics in VLSI systems design and analysis such as circuit design techniques, array structures, performance estimation, automated routing and device electronics. Credit will not be given for ECGR 5134 where credit has been given for ECGR 4188. *(Spring)*

ECGR 5135. Physical Electronics. (3) Prerequisite: ECGR 3122 or equivalent. Dynamics of charged particles; electron motion in electromagnetic fields; types of electron emission; beam focusing; longitudinal and transverse beam waves; microwave generation; plasma parameters. Credit will not be given for ECGR 5135 where credit has been given for ECGR 4135. *(On demand)*

ECGR 5137. Device Electronics for Integrated Circuits. (3)

Prerequisites: ECGR 3132 and ECGR 4134 or their equivalents. The basic operating principles of electronic devices in integrated circuits are treated. The physical models of these devices are discussed. Graduate students are required to carry out laboratory experimentation. Credit will not be given for ECGR 5137 where credit has been given for ECGR 4137. *(Fall) (Evenings)*

ECGR 5138. Electronic Thin Film Materials and Devices. (3)

Prerequisite: ECGR 4133 or 3132, or equivalent. Applications of thin films in microelectronics / optoelectronics manufacturing processes; vacuum technology, deposition techniques, and the characterization methods relevant to optoelectronic applications; thin film applications such as metallization, silicide formation, light emitting diodes (LED) and lasers, and doping of semiconductors. Credit will not be given for ECGR 5138 where credit has been given for ECGR 4138. *(Fall)*

ECGR 5139. Digital Communication Systems. (3)

Prerequisites: ECGR 3111 or equivalent. Topics include digital data transmission systems, signal and system representation, digital system performance characterization, pulse code modulation, and statistical communications theory. Credit will not be given for ECGR 5139 where credit has been given for ECGR 4139. *(On demand)*

ECGR 5140. Introduction to VLSI Processing. (3)

Prerequisite: permission of department. Microelectronic fabrication; relevant materials, processes, and tools; fabrication of a simple structure in the VLSI clean room/lab. Credit will not be given for ECGR 5140 where credit has been given for ECGR 4140. *(Fall)*

ECGR 5142. Power Generation: Operation and Control. (3)

Prerequisite: ECGR 4142 or equivalent. Characteristics of power generation units, steam, nuclear reactor and hydroelectric. Economic and thermal system dispatch.

Transmission losses, load flow problems. Hydro scheduling, hydro-plant models. Energy production cost models. Interchange evaluation. Credit will not be given for ECGR 5142 where credit has been given for ECGR 4190. *(Fall) (Alternate years) (Evenings)*

ECGR 5143. Dynamic and Transient Analysis of Power Systems. (3) Prerequisite: ECGR 4142 or equivalent.

Large-scale systems state descriptions and hierarchical control. State space models, dynamic stability and testing. Stability of simple and multi-machine systems. Transient phenomena in electrical power systems. Transient stability problem. Credit will not be given for ECGR 5143 where credit has been given for ECGR 4191. *(Spring) (Alternate years) (Evenings)*

ECGR 5146. Introduction to VHDL. (3) Prerequisites:

ECGR 2182 or equivalent and knowledge of a computer language. Introduction to VHSIC Hardware Description Language (VHDL) including VHDL-based high-level design of microelectronic systems, VHDL programming, and VHDL synthesis; emphasis on learning and using industry-standard VHDL tools running on VNIIX workstations. Credit will not be given for ECGR 5146 where credit has been given for ECGR 4146. *(Fall)*

ECGR 5161. Control of Robotic Manipulators. (3) Cross-

listed as MEGR 5128. Prerequisites: ECGR 4161 and 4111 or their equivalents. Control of industrial robots including linear, nonlinear, and adaptive control of robot's motion plus control of forces and torques exerted by the end-effector. Additional topics include computer animation of the controlled behavior of industrial robots, actuator and sensor types, robot vision, and control computer/robot interfacing. Credit will not be given for ECGR 5161 where credit has been given for ECGR 4162. *(Spring)*

ECGR 5165. Laser Electronics I. (3) Prerequisites: ECGR

3122 and PHYS 3141 or their equivalents. Basic principles of quantum electronics, interaction of light with atoms, properties of laser light, laser applications. Electromagnetic aspects of lasers, Maxwell's Equations and beam, ray optics, matrix methods for the analysis and synthesis of optical systems. Laser resonator design, oscillations modes, mode frequency and stability. Credit will not be given for ECGR 5165 where credit has been given for ECGR 4165. *(Fall)*

ECGR 5181. Computer Arithmetic. (3) Principles,

architecture and design of fast two operand adders, multi-operand adders, standard multipliers and dividers. Cellular array multipliers and dividers. Floating point processes, BCD and excess three adders, multipliers and dividers. Credit will not be given for ECGR 5181 where credit has been given for ECGR 4181. *(On demand)*

ECGR 5182. Digital System Testing. (3) Prerequisite:

ECGR 2181 or equivalent. System testing; Boolean difference; D-algorithm; checking experiments; redundancy, computer-aided digital test systems. Credit will not be given

for ECGR 5182 where credit has been given for ECGR 4182. *(Spring)*

ECGR 5187. Data Communications. (3) Principles of data communication; computer communications architecture (layering) with emphasis on the physical layer and data link layer, transmission media; analog and digital signal representation; data transmission basics; Shannon's theorem; error detection/correction; data compression; point-to-point protocols; multiplexing. Credit will not be given for ECGR 5187 where credit has been given for ECGR 4187. *(Fall)*

ECGR 5188. Modeling and Analysis of Dynamic Systems. (3) Prerequisite: ECGR 3111 or equivalent. Models and dynamical properties of mechanical, thermal, and fluid systems, utilizing by analogy the properties of electrical circuit theory. Emphasis on the formulation of circuit models and the development of terminal equations of system components. Dynamic response to step, pulse, and sinusoidal driving functions using Laplace transforms. Sinusoidal steady-state and frequency response of systems. Credit will not be given for ECGR 5188 where credit has been given for ECGR 4113. *(On demand)*

ECGR 5190. Acoustics. (3) Prerequisite: ECGR 3122 or equivalent. Vibrations and simple vibrating systems; radiating systems; plane waves of sound; dynamic analogies, microphones and other acoustic transducers; acoustic measurements. Credit will not be given for ECGR 5190 where credit has been given for ECGR 4122. *(On demand)*

ECGR 5191. Analog and Digital Communication. (3) Prerequisite: ECGR 3111 or equivalent. Analysis and transmission of signals including analog communication systems (amplitude and frequency modulation, effect of noise); digital communications systems (pulse code modulation, data transmission systems phase-shift keying and frequency-shift keying, effect of noise). Credit will not be given for ECGR 5191 where credit has been given for ECGR 4123. *(Fall) (Evenings)*

ECGR 5192. Solid State Microelectronics II. (3) Prerequisites: ECGR 3122 and 3133 or their equivalents. Advanced device concepts for MOSFET, bipolar, and CMOS integrated circuits. Gate length, transit time, and power-frequency limits. Device scaling concepts. Tunneling and avalanche devices, and hot electron behavior. Device and interconnect reliability and failure and device interconnects. Submicron channel, MODFET, and quantum well devices. High frequency solid state devices. Limits of switching speed. Solid state power devices. Credit will not be given for ECGR 5192 where credit has been given for ECGR 4134. *(Spring)*

ECGR 5193. Power System Analysis I. (3) Prerequisite: ECGR 3142 or equivalent. Representation of power system components for analysis studies. Transmission line parameters. Network equations. Load flow analysis and

numerical methods. Credit will not be given for ECGR 5193 where credit has been given for ECGR 4141. *(Fall)*

ECGR 5194. Power System Analysis II. (3) Prerequisite: ECGR 4141 or equivalent. Economic operation of power systems. Short circuit studies. Symmetrical components. Transient stability analysis. Credit will not be given for ECGR 5194 where credit has been given for ECGR 4142. *(Spring)*

ECGR 5195. Electrical Machinery. (3) Prerequisite: ECGR 3142 or equivalent. Advanced theory of transformers and rotating. Machines; harmonic and saturation effects on machine performance. Unbalanced operation and transient conditions. Credit will not be given for ECGR 5195 where credit has been given for ECGR 4143. *(On demand)*

ECGR 5196. Introduction To Robotics. (3) Cross-listed as MEGR 4127. Prerequisites: ECGR 2103 or equivalent. Modeling of industrial robots including homogeneous transformations, kinematics, velocities, static forces, dynamics, computer animation of dynamic models, motion trajectory planning, and introduction to vision, sensors and actuators. Credit will not be given for ECGR 5196 where credit has been given for either ECGR 4161 or MEGR 4127. *(Fall)*

ECGR 5197. Optical Communication. (3) Prerequisites: ECGR 4125 or equivalent. Overview of optical fiber, signal degradation in fiber, optical source, optical detectors, optical receiver, optical transmitter, optical network, signal processing, and signal distribution through DWDM and DWDDM. This course also addresses the recent topics in optical communication and optical signal. Credit will not be given for ECGR 5197 where credit has been given for ECGR 4186. *(Fall)*

ECGR 5231. Optical Materials. (3) Prerequisites: ECGR 4125 or equivalent. Overview of optical properties of semiconductors and dielectrics, optical waves in crystalline and periodic structures, optical nonlinearities and their applications in optical frequency conversions, and current topics in optical properties. *(Spring)*

ECGR 5261. Microwave Circuit Design I. (3) Prerequisites: ECGR 3131 or equivalent. Design and analysis of microwave devices and circuits; including microwave aspects of discrete active (i.e., field effect and bipolar transistors, etc.) and passive (i.e., microstrips, inductors, capacitors) components; device parameter extraction, using computer aided design (CAD) tools. Credit will not be given for ECGR 5261 where credit has been given for ECGR 4261. *(Fall)*

ECGR 5265. Microwave Devices and Electronics. (3) Prerequisites: ECGR 3122 and PHYS 2231 or their equivalents. Microwave transmission line theory, parameters, microwave waveguides, microstrip line and components including resonators, slow-wave structures, tees, rings, couplers, circulators, isolators, and microwave

tubes. Microwave solid state electronics including microwave transistors, tunnel diodes, transferred electron devices, avalanche transit-time devices, and mono-lattice microwave integrated circuits. Credit will not be given for ECGR 5265 where credit has been given for ECGR 4265. *(On demand)*

ECGR 5411. Control Systems Theory I. (3) Prerequisite: ECGR 3111 or equivalent. Transfer functions, block diagrams and signal flow graphs. Feedback control system characteristics. The performance and stability of feedback systems using root locus and frequency response methods. Time domain analysis of control systems. The design and compensation of control systems. Credit will not be given for ECGR 5411 where credit has been given for ECGR 4111. *(Fall)*

ECGR 5412. Control Systems Theory II. (3) Prerequisite: ECGR 4111 or equivalent. State space techniques and useful state space methods. System stability. Controllability and observability of linear systems. The formulation of the state equations for discrete-time systems and the analysis of these systems by matrices. Analysis of nonlinear systems. Optimal control systems studies. Credit will not be given for ECGR 5412 where credit has been given for ECGR 4112. *(Spring)*

ECGR 5431. Linear Integrated Electronics. (3) Prerequisite: ECGR 3132 or equivalent. Design of linear integrated circuits utilizing bipolar and MOS devices. Application in linear amplifier design, control and processing of analog signals. Power supply regulators, analog switches, and active filters. Credit will not be given for ECGR 5431 where credit has been given for ECGR 4131. *(Fall)*

ECGR 5892. Individualized Study. (1-6) Individual investigation and exposition of results. May be repeated for credit. *(On demand)*

ECGR 6021. Advanced Topics in EM and Applications. (3) Prerequisite: permission of Department. Possible topics include: advanced boundary value problems; nonlinear magnetic materials; wave guides and resonant cavities; magnetohydrodynamics and plasmas; relativistic effects; charged particle dynamics; radiation. Credit will not be given for ECGR 6021 where credit has been given for ECGR 8021. *(On demand)*

ECGR 6090. Special Topics. (1-6) Directed study of current topics of special interest. May be repeated for credit. *(On demand)*

ECGR 6101. Advanced Computer Graphics. (3) Prerequisites: ECGR 5103 and 5133 or permission of department. A project-oriented course using and developing techniques of CAD/CAM graphics, hardware and software development. Advanced application of graphics in computer-aided systems design. Credit will not be given for

ECGR 6101 where credit has been given for ECGR 8101. *(On demand)*

ECGR 6102. Optimization of Engineering Designs. (3) Prerequisite: ECGR 5101 or permission of department. The development of computationally feasible algorithms for solving optimization problems in engineering designs. Introduction to non-linear programming methods; study of constrained and unconstrained problems, linear programming problems and other related topics. Credit will not be given for ECGR 6102 where credit has been given for ECGR 8102. *(On demand)*

ECGR 6111. Systems Theory. (3) Prerequisite: ECGR 4112 or equivalent. State space concepts and solutions. Introduction to theory of deterministic linear systems. Application of matrix methods and vector difference equations to lumped parameter electrical mechanical and fluid systems, and discrete time systems. Frequency domain techniques in signal and systems analysis. Computer simulation of system dynamics. Credit will not be given for ECGR 6111 where credit has been given for ECGR 8111. *(Fall) (Evenings)*

ECGR 6112. Digital Control Systems. (3) Prerequisites: ECGR 6111 or permission of instructor. Time-domain and Z-domain analysis of linear discrete systems, open and closed loop sampled data systems, engineering characteristics of computer control systems, simulation of system dynamics. Credit will not be given for ECGR 6112 where credit has been given for ECGR 8112. *(Spring, Alternate years)*

ECGR 6114. Digital Signal Processing II. (3) Prerequisite: permission of Department. Discrete Hilbert Transforms, discrete random signals, effect of finite register length in digital and signal processing, speech processing, radar and other applications. Credit will not be given for ECGR 6114 where credit has been given for ECGR 8114. *(Spring, Alternate years) (Evenings)*

ECGR 6115. Optimal Control Theory I. (3) Prerequisite: ECGR 6111 or permission of Department. Optimum control of continuous-time and discrete time systems. The Maximum Principle and Hamilton Jacobi Theory. Theory of optimal regulator, state estimation and Kalman Bucy Filter. Combined estimation and control--the Linear Quadratic Gaussian Problems. Computational methods in optimum control systems. Credit will not be given for ECGR 6115 where credit has been given for ECGR 8115. *(Fall, Alternate years) (Evenings)*

ECGR 6116. Optimal Control Theory II. (3) Prerequisite: ECGR 6115 or permission of Department. A continuation of ECGR 6115 with emphasis on stochastic systems. Optimal filtering. Discrete-time Kalman filter and Kalman filter properties. Parameter identification. Multi-variable control systems, system sensitivity and robustness. Credit will not be given for ECGR 6116 where credit has been given for ECGR 8116. *(Spring, Alternate years) (Evenings)*

ECGR 6117. Multivariable Controls. (3) Prerequisites: ECGR 6111. Problem of robustness controls, emphasizing computer-oriented approaches; high infinity and algebraic methods current developments. Credit will not be given for ECGR 6117 where credit has been given for ECGR 8117. *(On demand)*

ECGR 6118. Applied Digital Image Processing. (3) Cross-listed with CSCI 6134. Digital image fundamentals; comparison of image transforms including Fourier, Walsh, Hadamard and Cosine; image data compression techniques; image enhancement algorithms; image restoration; image encoding process; image segmentation and description; relationship of hardware restrictions to image fidelity. Credit will not be given for ECGR 6118 where credit has been given for ECGR 8118. *(On demand)*

ECGR 6119. Applied Artificial Intelligence. (3) The theory of machine intelligence. Computational methods for modeling machine intelligence including machine vision and automatic decision making from sensor measurements. Applications of this theory to autonomous robotic decision making such as navigation and industrial quality control.

ECGR 6120. Wireless Communication and Networking. (3) Prerequisite: Graduate standing. The cellular concept: interference issues, cell layout and planning, control techniques, grade-of-service and system capacity; characteristics of the mobile radio channel and channel models; multiple access techniques in wireless: FDMA, TDMA, and CDMA; analog and digital cellular telephone standards; packet radio systems: description, medium access control, and routing issues. *(Spring)*

ECGR 6121. Advanced Theory of Communications I. (3) Prerequisite: introductory probability course or permission of department. Statistical communications theory and modern communications systems emphasizing modulation and methods of taking into account the effects of noise on various systems. Credit will not be given for ECGR 6121 where credit has been given for ECGR 8121. *(Fall, Alternate years) (Evenings)*

ECGR 6122. Advanced Theory of Communications II. (3) Prerequisite: graduate standing. Continuation of ECGR 6121 including coding and decoding methods. Wave form communications. Applications. Credit will not be given for ECGR 6122 where credit has been given for ECGR 8122. *(Spring, Alternate years) (Evenings)*

ECGR 6125. Advanced Topics in Optical Engineering. (3) Prerequisite: ECGR 5125 or permission of department. Overview of optical passive and active devices and discussion of current advances in optical technologies. Credit will not be given for ECGR 6125 where credit has been given for ECGR 8125. *(On demand)*

ECGR 6127. Medical Ultrasonics. (3) Prerequisite: ECGR 3122 or equivalent. Acoustic wave propagation in fluids and

solids, acoustic impedances, acoustic radiators and beam profiles; piezoelectricity, piezoelectric ceramics and polymers, integrated ultrasound transducers, design and testing of medical ultrasound transducers; hyperthermia, imaging, tissue characterization. Credit will not be given for ECGR 6127 where credit has been given for ECGR 8127. *(Spring)*

ECGR 6131. Hybrid Microelectronics. (3) Prerequisite: ECGR 5132 or permission of Department. A project-oriented course involving design, bonding, interconnect and testing of a multichip hybrid microelectronics circuit. Emphasis placed upon use of I.C.'s of various technologies in these designs to optimize performance. Credit will not be given for ECGR 6131 where credit has been given for ECGR 8131. *(On demand)*

ECGR 6132. Advanced Semiconductor Device Physics. (3) Prerequisite: ECGR 5137 or permission of Department. A review of semiconductor physics, bipolar and unipolar devices, photonic devices and methods of measuring specific device characteristics. Credit will not be given for ECGR 6132 where credit has been given for ECGR 8132. *(Spring)*

ECGR 6133. MOS Physics and Technology. (3) Prerequisite: ECGR 6132 or permission of the instructor. The theoretical and practical aspects of the metal oxide semiconductor (MOS) system, its electrical properties, and the measurement and the technology for their control. These topics are developed from simple beginnings to the current state of the art. Credit will not be given for ECGR 6133 where credit has been given for ECGR 8133. *(Fall)*

ECGR 6138. Physical Design of VLSI Systems. (3) Prerequisite: ECGR 5133 or equivalent. Synthesis and design of high-speed VLSI circuits; state-of-the-art approaches for circuit simulation; models and techniques for VLSI physical design. Credit will not be given for ECGR 6138 where credit has been given for ECGR 8138. *(Spring)*

ECGR 6141. Power System Relaying. (3) Prerequisite: ECGR 5141 or permission of Department. Function and principles of protective relaying instrument transformers. Directional, distance and differential relays. Protection of generators, transformers, and transmission lines. Ground fault protection. Computer relaying, algorithms for protective relaying. Credit will not be given for ECGR 6141 where credit has been given for ECGR 8141. *(On demand)*

ECGR 6142. Voltage Transients and Surge Protection. (3) Prerequisite: ECGR 5141 or permission of Department. Overvoltages due to lightning and switching surges. Traveling waves on transmission lines. Surge arrestors, insulation coordination. Surge protection of transmission lines, substations and rotating machine. Shielding and grounding. Credit will not be given for ECGR 6142 where credit has been given for ECGR 8142. *(On demand)*

ECGR 6143. Power System Control. (3) Prerequisites: ECGR 4142 and 4111 or their equivalents. Computer

functions for automatic control of power systems. Automatic generation control, regulation of frequency and tie-line power interchanges. Automatic voltage regulation, excitation system model. Power system dynamics. Computer control centers. Credit will not be given for ECGR 6143 where credit has been given for ECGR 8143. *(On demand)*

ECGR 6146. Advanced VHDL. (3) Prerequisite: ECGR 5146 or permission of Department. Continuation of ECGR 5146. FPGA design with VHDL; VHDL modeling libraries and techniques, and VHDL coding methodology for efficient synthesized. Credit will not be given for ECGR 6146 where credit has been given for ECGR 8146. *(Spring)*

ECGR 6151. Advanced Microelectronics Projects. (3) Prerequisite: ECGR 5133. Project-oriented course for the advanced microelectronics student to pursue the testing and simulation at various levels (component, gate, cell and system), as well as the design of a significant VLSI implementation. Credit will not be given for ECGR 6151 where credit has been given for ECGR 8151. *(On demand)*

ECGR 6156. Application Specific Integrated Circuit Design. (3) Prerequisite: ECGR 5133 or permission of Department. Basic concepts, techniques and CAD tools in Application Specific IC Designs (ASIC); technology of ASIC circuits, method of design, CAD tools, and simulation and verification; practical aspects of design. Credit will not be given for ECGR 6156 where credit has been given for ECGR 8156. *(Fall)*

ECGR 6157. CMOS Data Converters. (3) Prerequisite: ECGR 4132/5132 or equivalent. Advanced topics in VLSI CMOS data converters including Nyquist and Oversampled architectures. Includes a design project involving the design, system level modeling, circuit simulation, and layout of an analog-to-digital converter. *(On demand)*

ECGR 6171. Simulation of Electronic Materials. (3) Prerequisites: PHYS 6142 and PHYS 4271/ECGR 4185 or permission of Department. Tight-binding theory of periodic solids; band orbital theory applied the linear and non-linear optical properties of insulators and semiconductors; calculation of vibrational spectra; Green's Function methods for amorphous solids. Simulation of electrically active defects in solids. Credit will not be given for ECGR 6171 where credit has been given for ECGR 8171. *(On demand)*

ECGR 6183. Multiprocessor Systems Design. (3) Prerequisites: ECGR 3184 or equivalent and ECGR 5131 or permission of instructor. Topics include applications of multiprocessors to digital systems design; hardware/software tradeoff considerations; master/slave, multiple/master and loosely coupled systems; data handling and synchronization problems, networking. Credit will not be given for ECGR 6183 where credit has been given for ECGR 8183. *(On demand)*

ECGR 6184. Computer System Engineering. (3) Topics include data formats, register transfer operations, computer organization, microprogram control and ALU design. Arithmetic algorithms, I/O organization and memory organization are also covered. Specific emphasis is placed throughout on tradeoffs between hardware and software. Credit will not be given for ECGR 6184 where credit has been given for ECGR 8184. *(On demand)*

ECGR 6185. Advanced Embedded Systems Design. (3) Prerequisite: ECGR 4101/5101. An advanced course in embedded system design utilizing 16-bit microprocessors. Architecture, software, and interface techniques. This course is project-oriented, involving the use of a logic analyzer and hardware design tools. *(Spring) (Evenings)*

ECGR 6186. Design for Testability. (3) Prerequisite: ECGR 2181 or permission of Department. Fault modeling; test generation using the D-algorithm, PODEM, and FAN; partitioning; scan design, built-in self-testing; testing of array logic; and fault tolerance. Project-oriented course involving the use of logic and fault simulation tools. Credit will not be given for ECGR 6186 where credit has been given for ECGR 8186. *(Spring) (Evenings)*

ECGR 6187. Modeling and Analysis of Communication Networks. (3) Prerequisite: Probability theory or permission of department. Communication networks; application of analytical tools for modeling and performance evaluation of these networks, including stochastic processes, Markov models, queuing theory, and teletraffic theory. Credit will not be given for ECGR 6187 where credit has been given for ECGR 8187. *(Spring)*

ECGR 6261. Advanced Topics in Laser Electronics. (3) Prerequisite: ECGR 5165, or permission of instructor. Maxwell-Schrödinger analysis of interactions of light with atoms, Semiclassical laser equations, rate equation approximation. Effects of gain saturation, dispersion, spontaneous emission, and line broadening in laser amplifiers and oscillators. Laser power and frequency calculations. Relaxation oscillations, gain and loss switching, cavity-dumping, and mode-locking. Credit will not be given for ECGR 6261 where credit has been given for ECGR 8261. *(Spring)*

ECGR 6263. Advanced Analog Integrated Circuit Design. (3) Prerequisite: ECGR 4132/5132 or equivalent. Design of low-noise preamplifiers, advanced operational amplifiers, and other analog CMOS circuits, including analysis of noise and DC mismatch, and design from weak through strong inversion. Includes a design project involving analysis and simulation. *(On demand)*

ECGR 6264. Radio Frequency Design. (3) Prerequisites: permission of instructor. Design and analysis of radio frequency circuits and systems including S-parameters, impedance matching, noise, intermodulation distortion, image rejection, cascade analysis, and incorporation of these

methods in the design of modern radio receivers and transmitters. (*Spring*)

ECGR 6265. Neural Networks and Fuzzy Logic. (3)
Topics include: Fuzzy sets, fuzzy logic, fuzzy logic control systems, applications of neural networks, structure adaptive neural network, applications, fuzzy integrated systems, neural networks based fuzzy systems, applications, neural fuzzy controllers, applications in control systems. (*On demand*)

ECGR 6266. Neural Networks Theory and Design. (3)
Topics include: Neural network model and network architectures; single layers, multiple layers network, perceptron learning rules; supervised Hebbian learning; performance optimization; Widrow Hoff learning; backpropagation; associative learning; competitive learning; Grossberg network; Hopfield network; application of neural network. (*On demand*)

ECGR 6437. Mixed-Signal IC Design. (3) Prerequisite: permission of department. Design and analysis of mixed-signal integrated circuits and systems including amplifiers, digital circuits, analog-to-digital converters, voltage-controlled oscillators, integrated circuit layout, simulation, and fabrication using modern CAD tools. Students are expected to design, fabricate, and test a mixed-signal integrated circuit. (*Fall*)

ECGR 6890. Individualized Study and Projects. (1-6)
Individual investigation and exposition of results. May be repeated for credit. (*On demand*)

ECGR 6990. Industrial Internship. (1-3) Prerequisite: Completion of nine hours of graduate coursework. Full or part-time academic year internship in engineering complementary to the major course of studies and designed to allow theoretical and course-based practical learning to be applied in a supervised industrial experience. Each student's program must be approved by their graduate program director. Requires a mid-term report and final report to be graded by the supervising faculty. (*On demand*)

ECGR 6991. Graduate Master Thesis Research. (0-6)
Individual investigation culminating in the preparation and presentation of a thesis. May be repeated for credit. (*On demand*)

ECGR 7999. Master's Degree Graduate Residency Credit. (1)

ECGR 8021. Advanced Topics in EM and Applications. (3) See ECGR 6021 for Course Description. Credit will not be given for ECGR 8021 where credit has been given for ECGR 6021.

ECGR 8090. Special Topics. (1-6) See ECGR 6090 for Course Description.

ECGR 8101. Advanced Computer Graphics. (3) See ECGR 6101 for Course Description. Credit will not be given for ECGR 8101 where credit has been given for ECGR 6101.

ECGR 8102. Optimization of Engineering Designs. (3)
See ECGR 6102 for Course Description. Credit will not be given for ECGR 8102 where credit has been given for ECGR 6102.

ECGR 8111. Systems Theory. (3) See ECGR 6111 for Course Description. Credit will not be given for ECGR 8111 where credit has been given for ECGR 6111.

ECGR 8112. Digital Control Systems. (3) See ECGR 6112 for Course Description. Credit will not be given for ECGR 8112 where credit has been given for ECGR 6112.

ECGR 8114. Digital Signal Processing II. (3) See ECGR 6114 for Course Description. Credit will not be given for ECGR 8114 where credit has been given for ECGR 6114.

ECGR 8115. Optimal Control Theory I. (3) See ECGR 6115 for Course Description. Credit will not be given for ECGR 8115 where credit has been given for ECGR 6115.

ECGR 8116. Optimal Control Theory II. (3) See ECGR 6116 for Course Description. Credit will not be given for ECGR 8116 where credit has been given for ECGR 6116.

ECGR 8117. Multivariable Controls. (3) See ECGR 6117 for Course Description. Credit will not be given for ECGR 8117 where credit has been given for ECGR 6117.

ECGR 8118. Applied Digital Image Processing. (3) See ECGR 6118 for Course Description. Credit will not be given for ECGR 8118 where credit has been given for ECGR 6118.

ECGR 8119. Applied Artificial Intelligence. (3) See ECGR 6119 for Course Description. Credit will not be given for ECGR 8119 where credit has been given for ECGR 6119.

ECGR 8120. Wireless Communication and Networking. (3) See ECGR 6120 for Course Description. Credit will not be given for ECGR 8120 where credit has been given for ECGR 6120.

ECGR 8121. Advanced Theory of Communications I. (3)
See ECGR 6121 for Course Description. Credit will not be given for ECGR 8121 where credit has been given for ECGR 6121.

ECGR 8122. Advanced Theory of Communications II. (3)
See ECGR 6122 for Course Description. Credit will not be given for ECGR 8122 where credit has been given for ECGR 6122.

ECGR 8125. Advanced Topics in Optical Engineering. (3) See ECGR 6125 for Course Description. Credit will not be given for ECGR 8125 where credit has been given for ECGR 6125.

ECGR 8127. Medical Ultrasonics. (3) See ECGR 6127 for Course Description. Credit will not be given for ECGR 8127 where credit has been given for ECGR 6127.

ECGR 8131. Hybrid Microelectronics. (3) See ECGR 6131 for Course Description. Credit will not be given for ECGR 8131 where credit has been given for ECGR 6131.

ECGR 8132. Advanced Semiconductor Device Physics. (3) See ECGR 6132 for Course Description. Credit will not be given for ECGR 8132 where credit has been given for ECGR 6132.

ECGR 8133. MOS Physics and Technology. (3) See ECGR 6133 for Course Description. Credit will not be given for ECGR 8133 where credit has been given for ECGR 6133.

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ECGR 8157. CMOS Data Converters. (3) Credit will not be given for ECGR 8157 where credit has been given for ECGR 6157.

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ECGR 8183. Multiprocessor Systems Design. (3) See ECGR 6183 for Course Description. Credit will not be given for ECGR 8183 where credit has been given for ECGR 6183.

ECGR 8184. Computer System Engineering. (3) See ECGR 6184 for Course Description. Credit will not be given for ECGR 8184 where credit has been given for ECGR 6184.

ECGR 8185. Advanced Microprocessor-Based Design. (3) See ECGR 6185 for Course Description. Credit will not be given for ECGR 8185 where credit has been given for ECGR 6185.

ECGR 8186. Design for Testability. (3) See ECGR 6186 for Course Description. Credit will not be given for ECGR 8186 where credit has been given for ECGR 6186.

ECGR 8187. Modeling and Analysis of Communication Networks. (3) See ECGR 6187 for Course Description. Credit will not be given for ECGR 8187 where credit has been given for ECGR 6187.

ECGR 8261. Advanced Topics in Laser Electronics. (3) See ECGR 6261 for Course Description. Credit will not be given for ECGR 8261 where credit has been given for ECGR 6261.

ECGR 8263. Advanced Analog Integrated Circuit Design. (3) See ECGR 6263 for Course Description. Credit will not be given for ECGR 8263 where credit has been given for ECGR 6263.

ECGR 8265. Neural Networks and Fuzzy Logic. (3) See ECGR 6265 for Course Description. Credit will not be given for ECGR 8265 where credit has been given for ECGR 6265.

ECGR 8266. Neural Networks Theory and Design. (3) See ECGR 6266 for Course Description. Credit will not be given for ECGR 8266 where credit has been given for ECGR 6266.

ECGR 8890. Individualized Study and Projects. (1-6) See ECGR 6890 for Course Description.

ECGR 8990. Industrial Internship. (1-3) See ECGR 6990 for Course Description.

ECGR 8999. Doctoral Dissertation Research. (0-9) Individual investigation culminating in the preparation and presentation of a doctoral dissertation. (*On demand*)

ECGR 9999. Doctoral Degree Graduate Residency Credit.
(1)

Engineering Management

• M.S. in Engineering Management

Engineering Management Program

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704-687-3535
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Director

Dr. S. Gary Teng, Professor

Graduate Faculty

Steven Gardner, Adjunct Professor
Churlzu Lim, Assistant Professor
Ertunga Ozelkan, Assistant Professor
Yesim Sireli, Assistant Professor
S. Gary Teng, Professor and Director
James H. Woodward, Adjunct Professor

MASTER OF SCIENCE IN ENGINEERING MANAGEMENT

The Engineering Management Master of Science Degree program prepares professionals for careers in managing projects, programs, systems, and organizations. Industrial, research, consulting, and commercial firms now demand engineering managers with both cutting-edge technical competence and the management skills necessary to forge linkages with the systems and business sides of these organizations. These managers must be able to form and manage high performance teams and manage business and technological operations. The program of study is necessarily multidisciplinary, combining elements of advanced study in various engineering disciplines with studies of business and system operations and organizational behavior.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the Engineering Management program seeks the following from applicants to the Master's program in Engineering Management:

- 1) Either a bachelor's degree in engineering or a closely related technical or scientific field, or a bachelors degree

in business, provided relevant technical course requirements have been met. It is expected that some students in the second category will have a major in business and a minor in engineering.

- 2) Undergraduate coursework in engineering economics (SEGR 2106 at UNC Charlotte).
- 3) Integral and differential calculus (MATH 1120 and 1121 at UNC Charlotte).
- 4) Statistics (STAT 1220 or STAT 3128 at UNC Charlotte).
- 5) An average grade of 3.0 (out of 4) on items 2, 3, and 4 above.

Documents to be submitted for admission

- 1) Transcript(s) showing a baccalaureate degree in engineering, engineering technology, or a scientific discipline, or a baccalaureate degree in business administration from an accredited college or university.
- 2) A satisfactory score on the General Test of the Graduate Record Examination (depending on the student's background, the Graduate Management Admission Test, GMAT, may be substituted in certain cases).
- 3) Written descriptions of any relevant and significant work experience.
- 4) If the applicant's native language is not English, an overall score of 575 (paper-based test), 230 (computer-based test), or 90 (Internet-based test) in the Test of English as a Foreign Language (TOEFL).

Early Entry Program

Undergraduate students with at least 75 semester hours completed toward a baccalaureate degree in Civil, Electrical, or Mechanical engineering, or Engineering Technology at UNC Charlotte may be admitted to the MS Engineering Management Program as an Early Entry student provided they meet all other requirement of admission except the first item of the admission requirements.

Degree Requirements

Thirty semester hours of approved graduate work within one of two options:

Option 1: Successful completion of 30 semester hours of graduate-level coursework.

Option 2: Successful completion of 24 semester hours of graduate-level coursework and 6 hours of thesis research.

The curriculum consists of six core courses and four additional courses (or two courses with the thesis option) selected from an approved list of electives. Students are expected to complete a Plan of Study that identifies a concentration such as Manufacturing Management, Technology Management, Systems Management, or Supply Chain Management.

Required Core Courses:

- 1) EMGT 6980 Industrial and Technology Management Seminars (1)

(EMGT students must have three credits in this course.)

- 2) Three courses from among the following:
 - EMGT 6142 Quality & Manufacturing Mgmt (3)
 - EMGT 6901 Advanced Project Management (3)
 - EMGT 6902 Legal Issues in Engineering Mgmt (3)
 - EMGT 6904 Product and Process Design (3)
 - EMGT 6906 Processing Systems Simulation (3)
 - EMGT 6950 Engineering Systems Integration (3)
 - EMGT 6955 Systems Reliability Engineering (3)
 - EMGT 6985 Engineering Management Project (3)

- 3) Two courses from among the following:
 - MBAD 6141 Operations Management (3)
 - MBAD 6161 Org Leadership & Behavior I (3)
 - MBAD 6164 Executive Communications (3)
 - MBAD 6195 Strategic Mgmt of Technology (3)

Note: Students will be required to have adequate preparation prior to taking the required MBAD (Master in Business Administration) courses. Normally this will consist of at least completion of courses in engineering economics, foundations of economics, and mathematics through differential and integral calculus. Students will be advantaged by having completed courses in foundations of accounting and statistics.

Interdisciplinary Elective Courses (four courses or two courses with thesis option) from the following Engineering Management Program course list or approved by your advisor from other graduate programs.

- EMGT 6142 Quality & Manufacturing Mgmt (3)
- EMGT 6901 Advanced Project Management (3)
- EMGT 6902 Legal Issues in Engineering Management (3)
- EMGT 6904 Product and Process Design (3)
- EMGT 6905 Designed Experimentation (3)
- EMGT 6906 Processing Systems Simulation (3)
- EMGT 6910 Technological Decision-Making (3)
- EMGT 6912 Techniques and Intelligent Tools for Engineering Decision Support (3)
- EMGT 6915 Engineering Decision Analysis (3)
- EMGT 6920 Logistics Engineering & Mgmt (3)
- EMGT 6930 Capital Cost Estimating (3)
- EMGT 6950 Engineering Systems Integration (3)
- EMGT 6952 Engineering Systems Optimization (3)
- EMGT 6955 Systems Reliability Engineering (3)
- EMGT 6985 Engineering Management Project (3)
- EMGT 6090 Lean Supply Networks (3)
- EMGT 6090 Financial Management for Global Engineering Operations (3)

Graduate courses from other programs may be taken as elective courses for the engineering management degree with approval of the program director. Students are responsible for fulfilling the prerequisites of the courses they plan to take from other graduate programs.

Admission to Candidacy Requirements

Each student is required to submit a Plan of Study to the Department's Graduate Director. Upon completion of a substantial amount of the graduate work, each student must file an Admission to Candidacy form to the Graduate School by the filing date specified in the University Calendar.

Application for Degree

Students preparing to graduate must submit an online Application for Degree by the filing date specified in the University Calendar. If a student does not graduate in the semester identified on the Application for Degree, then the student must update his/her Admission to Candidacy and submit a new Application for Degree for graduation in a subsequent semester.

COURSES IN ENGINEERING MANAGEMENT

EMGT 6090. Special Topics. (1-6) Directed study of current topics of special interest. May be repeated for credit. *(On demand)*

EMGT 6142. Quality and Manufacturing Management. (3) Provides an in-depth study of current issues and advances in manufacturing management. Topics include just-in-time inventory management, total quality management, statistical process control, continuous improvement, flexible manufacturing systems, computer-integrated manufacturing, technology evaluation and selection, and manufacturing strategy. Emphasis on use of computers for decision support. *(On demand)*

EMGT 6890. Individual Study. (1-6) Individual investigation and exposition of results. May be repeated for credit. *(On demand)*

EMGT 6901. Advanced Project Management. (3) Prerequisite: Permission of Instructor. Study of various aspects of project management including project types and organizations, regulatory and liability issues, planning, budget, risk assessment, and conflict resolution. Exercises involve research into emerging management processes, use of computerized techniques, and application of management theories in team-based projects. *(On demand)*

EMGT 6902. Legal Issues in Engineering Management. (3) Survey of legal issues surrounding engineering products and services, including warranty, liability, contracting, intellectual property, codes, and accepted practice. Legal principles, precedents, case studies, and research projects. *(On demand)*

EMGT 6904. Product and Process Design. (3) Application of principles of creative problem solving to design of products and processes by multi-disciplinary teams. Taking as the definition of design "the communication of a set of

rational decisions for accomplishing stated objectives within prescribed constraints," the teams produce elements of designs for various products and services at points in the sequential stages of design. Teams make periodic reports and presentations to the class on design assignments. *(On demand)*

EMGT 6905. Designed Experimentation. (3)

Prerequisites: Statistics and permission of instructor. Design of quality into products and processes using statistically designed experimentation (DOE), a systematic and efficient method of design optimization for enhanced performance, quality, and cost. Emphasis on designing and conducting useful experiments rather than the basis in statistical theory. Includes robust parameter design and tolerance design techniques. Review and comparison of Taguchi methods with conventionally designed experimentation. Extensive use of specialized computer software to design experiments and analyze results in team projects; screening experiments, and sequential response surface methods. *(On demand)*

EMGT 6906. Processing Systems Simulation. (3)

Prerequisite: Statistics. Principles and application of selecting, planning, and executing simulation projects for processing systems, and developing and experimenting with simulation models. Discrete event simulation is particularly powerful for modeling and experimenting with systems exhibiting interdependencies and variability - such as manufacturing and service systems. Students will learn simulation project management, modeling, and experimenting using commercial simulation software products. *(On demand)*

EMGT 6910. Technological Decision-Making. (3)

Prerequisite: Permission of Instructor. This course covers several techniques for engineering product design, development and improvement. A variety of decision making techniques such as several forecasting methods and quality function deployment are discussed specifically in the context of systems engineering applications, based on engineering design philosophy of cross- functional cooperation in order to create high quality products. Students will learn how to use these techniques for making effective engineering decisions in a technological environment. *(On demand)*

EMGT 6912. Techniques and Intelligent Tools for Engineering Decision Support. (3)

Prerequisite: Permission of Instructor. This course surveys and introduces techniques and automated tools to support complex engineering decision-making, as well as methods for evaluating and selecting appropriate tools. During the course we will review and introduce decision-making processes and techniques; traditional automated decision support tools such as CAD, FEA, CFD, and other conventional modeling and simulation tools; decision support tools based on soft-computing technologies such as knowledge based expert systems, fuzzy logic, artificial neural nets, and genetic algorithms; and methods to evaluate and select tools appropriate for specific applications. Students

will be introduced to an overview of the underlying technologies used in the tools, learn the characteristics of applications appropriate for the tools, learn how to evaluate and select the decision support tools appropriate for an application, and demonstrate their understanding by preparing examples in applications. *(On demand)*

EMGT 6915. Engineering Decision Analysis. (3)

Prerequisites: Integral and Differential Calculus, Statistics, Probability or Permission of Instructor. This course aims to provide some useful tools for analyzing difficult decisions and making the right choice. After introducing components and challenges of decision making, the course will proceed with the discussion of structuring decisions using decision trees and influence diagrams. Decision making under uncertainty will be emphasized including maximax, maximin, and minimax regret techniques. Modeling of different risk attitudes based on risk and return tradeoffs will be analyzed through utility theory. Finally, decisions under conflicting objectives and multiple criteria will be discussed along with some introduction to game theory. *(On demand)*

EMGT 6920. Logistics Engineering and Management. (3)

Prerequisite: Permission of Instructor. This course introduces logistics systems from a systems engineering perspective. It starts from the design of effective and efficient systems with their respective maintenance and support infrastructures to the coordination of the production and distribution of systems and products for customer use at different stages of a final product's life cycle. The emphasis is on the design and implementation of effective and efficient logistics systems and supply chains. The course contents also include the current management issues in logistics systems implementation and supply chain operations. *(On demand)*

EMGT 6930. Capital Cost Estimating. (3)

Prerequisite: Permission of Instructor. Provides in-depth study of cost management issues in a technological business environment. It covers cost concepts including project evaluation techniques based on cost, capital planning and budgeting, investment evaluation under risk and uncertainty, rate of return methods, estimating for economic analyses, inflation effects, depreciation and income taxes, and capital investment decision analysis. Private and public sector cost issues are also discussed. The tools and techniques presented are useful for engineering, business, or management professionals of any organization. Students will learn how to use the course material for effective project management, budgeting, and decision making. *(On demand)*

EMGT 6950. Engineering Systems Integration. (3)

Prerequisite: Permission of Instructor. This course is an introduction to the relevant issues and required techniques for successful systems design development, integration, management, and implementation. Principles and methods for system life-cycle analysis, system planning and management, and systems integration. Interfaces between the system, subsystems, the environment, and people.

Students will learn the factors to control the total system development process designed to ensure a high quality and effective system. (*On demand*)

EMGT 6952. Engineering Systems Optimization. (3)
Prerequisite: Calculus and Linear Algebra or permission of the instructor. The main objective of this course is to develop fundamental problem solving skills for engineers and engineering managers using techniques for optimizing engineering systems. A systems engineering approach will be followed to analyze practical applications from different engineering disciplines and to optimize complex systems. Model formulation, sensitivity analysis, special cases, solutions using commercially available software applications and practical implementation considerations will be emphasized. (*On demand*)

EMGT 6955. Systems Reliability Engineering. (3)
Prerequisites: Calculus and Statistics. Introduction of concepts and methods for the design, testing and estimation of component and system reliabilities. Topics include: reliability mathematics; analysis of reliability data; reliability prediction and modeling; reliability testing; maintainability and availability; failure mode and effects analysis and failure rates; reliability design and implementation; application of concurrent engineering and reliability methods to integrate reliability tests into the overall system development cycle to reduce overall life cycle costs. (*On demand*)

EMGT 6980. Industrial and Technology Management Seminars. (1) Prerequisite: Permission of Instructor. A series of seminars covering current management issues, challenges and practices in industrial, government, and business sectors of industry. May be repeated for credit. (All students in the Engineering Management MS Program are required to take this course for three semesters.) (*Fall, Spring*)

EMGT 6985. Engineering Management Project. (3)
Prerequisite: EMGT 6901 and two other program required EMGT courses. This course will offer a hands-on real world industrial/business project. The emphasis will be on the design and implementation of effective methods on the development and/or improvement of products, processes, procedures, or systems. A 3-member project committee includes a faculty project advisor, the industrial project advisor, and a faculty member in the technical area has to be established before taking this project course. This project will be a capstone project for the students in the Engineering Management Master of Science Program. (*On demand*)

EMGT 6990. Industrial Internship. (1-3) Prerequisite: Completion of nine hours of graduate coursework. Full- or part-time academic year internship in engineering complementary to the major course of studies and designed to allow theoretical and course-based practical learning to be applied in a supervised industrial experience. Each student's program must be approved by their graduate program director. Requires a mid-term report and final report to be

submitted. (This course cannot be counted as part of the degree required 30 credits). (*On demand*)

EMGT 6991. Graduate Master Thesis Research. (1-6)
Individual investigation culminating in the preparation and presentation of a thesis. May be repeated for credit. (*On demand*)

EMGT 7999. Master's Degree Graduate Residency Credit. (1) Required for continuing registration and enrollment while completing thesis or research project. (*On demand*)

Mechanical Engineering and Engineering Science

- M.S. in Mechanical Engineering (MSME)
- M.S. in Engineering (MSE)
- Ph.D. in Mechanical Engineering

Department of Mechanical Engineering and Engineering Science

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Director of Graduate Programs

Dr. Harish P. Cherukuri

Graduate Faculty

Kingshuk Bose, Adjunct Professor
Harish P. Cherukuri, Professor
Robin N. Coger, Professor
James F. Cuttino, Associate Professor
Matthew A. Davies, Associate Professor
Paul H. DeHoff, Professor Emeritus
Ahmed El-Ghannam, Associate Professor
Gloria D. Elliott, Assistant Professor
Horacio V. Estrada, Associate Professor
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Jerre Hill, Senior Lecturer
Robert J. Hocken, Norvin Kennedy Dickerson Jr.
Distinguished Professor
Robert E. Johnson, Professor
Russell G. Keanini, Professor
Scott D. Kelly, Associate Professor
Rhyn H. Kim, Professor Emeritus

Kevin M. Lawton, Lecturer
 Charles Y. Lee, Associate Professor
 Churlzu Lim, Assistant Professor
 John B. Mason, Adjunct Professor
 Thomas H. McCoy, Adjunct Professor
 Dan Metz, Adjunct Professor
 Jimmie A. Miller, Adjunct Professor
 Ramesh Minisandram, Adjunct Professor
 Ganesh P Mohanty, Cone Professor, Emeritus
 Edward P. Morse, Associate Professor
 Brigid A. Mullany, Assistant Professor
 Edgar G. Munday, Associate Professor
 Bala Muralikrishnan, Adjunct Professor
 Donna S. Nussman, Adjunct Professor
 Ertunga C. Ozelkan, Assistant Professor
 John Patten, Adjunct Professor
 Steven R. Patterson, SPX Distinguished Professor
 Jayaraman Raja, Professor
 James Salisbury, Adjunct Professor
 Yesim Sireli, Assistant Professor
 Ronald E. Smelser, Professor
 K. Scott Smith, Professor
 Stuart T. Smith, Professor
 Ahmed Soliman, Associate Professor
 Nilabh Srivastava, Assistant Professor
 S. Gary Teng, Professor
 Mesbah Uddin, Associate Professor
 Qiuming Wei, Assistant Professor
 Robert G. Wilhelm, Professor
 Bethany A. Woody, Adjunct Professor
 Terry T. Xu, Assistant Professor

The department of Mechanical Engineering and Engineering Science offers degree programs leading to the Master of Science in Mechanical Engineering (MSME), the Master of Science in Engineering (MSE), and the Doctor of Philosophy (Ph.D.) in Mechanical Engineering. At the Master's level, the program is broad based, allowing students to develop expertise in a number of areas including design, manufacturing, thermal and fluid sciences, solid mechanics, bioengineering, materials engineering and science, and mechanical control and instrumentation. The Ph.D. program is more closely focused on precision engineering and manufacturing, computational modeling and simulation, and biomedical engineering. The graduate program is supported by a world class metrology laboratory, numerous graduate research and computer labs, core and specialized biotechnology laboratories, and a first rate machine shop managed by a group of highly skilled lab and shop personnel. The William States Lee College of Engineering also supports a network of engineering computer laboratories.

PH.D. IN MECHANICAL ENGINEERING

The Department of Mechanical Engineering and Engineering Science offers multi-disciplinary programs leading to a Ph.D. degree in mechanical engineering in the areas of automotive engineering, biomedical engineering (BME), computational modeling and simulation (CMS), and precision engineering and manufacturing (PE).

The objectives of the Ph.D. program are as follows.

- To provide our students with the opportunity to develop a breadth of knowledge in mechanical engineering so that they can adapt to the changing requirements of the technological workplace.
- To develop engineering researchers who can contribute to the development of new knowledge and the dissemination of best practices in academic, industrial, and government environments.
- To prepare graduates for personal and professional success, both as individuals and in team environments.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for study toward the Ph.D. program in Mechanical Engineering:

- 1) A master's degree in engineering or a closely allied field with a GPA of at least 3.5. Exceptional students with only a baccalaureate degree may also be considered for admission to the Ph.D. program.
- 2) The applicant must receive a satisfactory score on the verbal and quantitative sections of the Graduate Record Examination General Test.
- 3) Three letters of reference, at least two of which must be from faculty members. All three must be from professionals working in the applicant's field of interest.

Acceptability for admission is based upon the applicant's record and background as determined by the department.

Degree Requirements

- 1) Appointment of a Ph.D. advisor and formation of an advisory committee.
- 2) Development of a Ph.D. Plan of Study detailing all course and examination requirements.
- 3) Successful completion of the written qualifying examination.
- 4) Presentation of a proposal for Ph.D. research and admission to candidacy.
- 5) Successful defense of the Ph.D. Dissertation.

Within the first semester of being admitted into a Ph.D. program, the student should choose a Ph.D. advisor and form an advisory committee. In conjunction with the Ph.D. advisor and the advisory committee, the student will

develop a Plan of Study to meet the Ph.D. program requirements of course work and examinations and prepare to undertake original research leading to a dissertation of a quality that would be acceptable for publication of articles in peer-refereed professional journals.

Plan of Study

The Plan of Study must show at least 72 hours of credit beyond the baccalaureate degree including at least 18 hours of research/dissertation credits. For students who do not possess appropriate bachelor's and/or master's degrees in engineering, additional course work will be expected. The specific course requirements will be set by the student's advisory committee but must include: At least 18 hours of MEEES coursework and 6 hours of graduate level mathematics. The Plan of Study must be submitted to the Graduate Coordinator of the Department for review and approval within the second semester after admission to the Ph.D. program.

Residence

A student may satisfy the residency requirement for the program by completing 18 hours, either course work or research credits, by study-in-residence during the academic year and during the summer terms, as long as the study is continuous. Study-in-residence is deemed to be continuous if the student is enrolled in one or more courses (including research/dissertation credit) in successive semesters until eighteen hours of credit are earned.

Grades

A student is expected to achieve A's or B's in all course work taken for graduate credit and must have a GPA of at least a 3.0 in order to graduate. The dissertation is graded on a Pass/Unsatisfactory basis and, therefore, will not be included in the cumulative average. An accumulation of more than two marginal C grades will result in termination of the student's enrollment in the graduate program. If a student makes a grade of U in any course, enrollment will be terminated. A graduate student whose enrollment has been terminated because of grades is ineligible to attend any semester or summer session unless properly readmitted to the graduate program. Readmission to the program requires approval of the Dean of the Graduate School upon the recommendation of the student's major department and the Engineering Doctoral Graduate Committee of the College of Engineering.

Qualifying Examination

After completing two semesters in the PhD program, every student will take qualifying exams in math and two topical areas, selected by the student and his/her dissertation committee. The student and committee will select 4 out of the 9 subjects in the math syllabus for the math qualifying exam. The student will be tested on these 4 subjects. The student must answer all the questions in these 4 subjects and obtain 70% or above to pass.

The student and the committee will select the two areas for the topical exams. 70% or above is the passing grade in the two topic areas.

For each of the three exams, two outcomes are possible: Pass (70% or more) or Fail (<70%). If the student passes all three of the exams, the student must present his thesis topic proposal to his/her dissertation committee in the semester following the semester in which the qualifying exam is taken. If the student fails any or all of the exams in the first attempt, then he/she will either be allowed to retake the failed exam(s) or terminated from the program. If the student fails any exam for the second time, this is sufficient grounds for termination from the program.

Admission to Candidacy Requirements

The single requirement for admission to candidacy is the appointment of an advisory committee. This committee will consist of at least four graduate faculty members. Two of these four members shall be from a department other than the student's major. One of these external members shall be chosen by the student in consultation of his graduate advisor and the other member is appointed by the graduate school. The graduate advisor serves as chair of the committee. The committee is recommended by the department after appropriate consultation between the advisor and student.

Dissertation Proposal and Admission to Candidacy

Because the Ph.D. program is heavily based on independent research, each student must write a proposal describing his/her proposed dissertation research following the technical guidelines established by the department. Upon approval of the student's dissertation proposal, the advisory committee will recommend the student's admission to candidacy. This is subject to the approval of the Dean of the Graduate School.

Upon completion of a substantial amount of graduate work and in no case later than the 8th instructional day of the semester in which the student expects to complete all requirements for the degree, the student shall file an Admission to Candidacy form to the Graduate School. This application is a checklist approved by the advisor, department chair, and the College Dean listing all coursework to be offered for the degree (including transfer credit and courses in progress). A tentative date for the dissertation defense should be agreed upon by the candidate and chair and indicated on this application. The date should be realistic and allow ample time for completion and review of the dissertation.

Application for Degree

Student preparing to graduate must submit an online Application for Degree by the filing data specified in the University Academic Calendar. If a student does not graduate in the semester identified on the Application for Degree, then the student must update his/her Admission to

Candidacy and submit a new Application for Degree for graduation in a subsequent semester.

Dissertation

Evidence of a high degree of competence in scholarship, written exposition, independent inquiry and the ability to organize and apply knowledge must be demonstrated by the student in the dissertation. The student will make a public defense of the dissertation at which time the dissertation, as well as the student's knowledge of the field, will be appropriate matter for examination by the student's advisory committee. Although questions may be asked by the general audience, evaluation of the dissertation defense is the sole responsibility of the advisory committee. The dissertation will be graded on a Pass/Unsatisfactory basis.

Assistantships

Teaching and Research Assistantships (TAs and RAs, respectively) are available on a competitive basis.

Tuition Waivers

In-State and Out-of-State tuition support (Resident/Non-Resident Tuition Differentials, respectively) is available, on a competitive basis, to full time students with financial assistantships from UNC Charlotte.

Time Limit

Students are allowed a maximum of eight (8) calendar years from formal admission to the Ph.D. program to complete the program successfully.

MASTER OF SCIENCE IN ENGINEERING AND MASTER OF SCIENCE IN MECHANICAL ENGINEERING

The Department of Mechanical Engineering and Engineering Science offers programs of study and research leading to the Master of Science in Mechanical Engineering (M.S.M.E.) and the Master of Science in Engineering (M.S.E.). The M.S.M.E program of study is for students who have completed a B.S.M.E. degree while the M.S.E. degree offers a more generic program of study for students who may not possess a baccalaureate degree in engineering.

The objectives of the M.S.M.E and M.S.E. program are as follows.

- To provide our students with the opportunity to develop a breadth of knowledge in mechanical engineering so that they can adapt to the changing requirements of the technological workplace.
- To produce graduates who are able to practice as mechanical engineers with advanced skills and serve state, regional, and national industries.
- To prepare graduates for personal and professional success, both as individuals and in team environments.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for study toward the Master's programs in Mechanical Engineering:

Applicants must demonstrate evidence of satisfactory undergraduate preparation in engineering, usually manifested by the possession of a baccalaureate degree from an accredited institution in some area of engineering, with a grade point average of at least 3.0 on a 4.0 scale. Special consideration may be given to candidates with substantial engineering work experience.

Applicants with baccalaureate degrees from fields other than engineering (e.g., biology, physics, chemistry, mathematics, etc.) may be considered for admission to graduate study. Typically these applicants complete mathematics, science, and engineering courses, as determined by the Director of Graduate Programs, before entering the graduate program.

The applicant must receive a satisfactory score on the verbal and quantitative sections of the Graduate Record Examination General Test.

Acceptability for admission is based upon the applicant's record and background as determined by the department.

Early-Entry to Graduate School

Exceptional undergraduate students at UNC Charlotte may be accepted into the graduate program and begin work toward a graduate degree before completion of the baccalaureate degree. An applicant may be accepted at any time after completion of 75 or more hours, although it is expected that close to 90 hours will have been earned by the time the first graduate course is taken.

To be accepted into this program, an undergraduate student must have at least a 3.2 overall GPA and have taken the appropriate graduate standardized test and have earned an acceptable score. If any early-entry student has not met the normal admission requirements of a 2.75 overall undergraduate GPA and a 3.0 junior-senior GPA at the end of his/her baccalaureate degree, she/he will be dismissed from the graduate program.

Students accepted into an early-entry program will be subject to the same policies that pertain to other matriculated graduate students. Generally, it will be assumed that early-entry students will finish their baccalaureate degrees before they complete 15 hours of graduate work.

Up to six hours earned at the graduate level may be substituted for required undergraduate hours. (Up to six hours of graduate work may be "double counted" toward both baccalaureate and graduate degrees.)

Degree Requirements

The applicant must complete at least 30 approved graduate credit hours as prescribed by the graduate advisor and fulfill the following:

- A minimum of 12 semester hours of coursework in Mechanical Engineering and Engineering Science.
- The completion of one mathematics course (3 hrs).
- Students pursuing the thesis or creative design project option may complete up to 6 hours of thesis research.
- Students pursuing the problem report option may complete up to 3 hours of problem report.
- Students pursuing the coursework-only option must satisfactorily complete a comprehensive exam that is administered by the advisory committee.

The required mathematics course can be any 6000 level math course approved by the thesis advisor or one of the following:

- MATH 6171 Advanced Applied Mathematics I
- MATH 6172 Advanced Applied Mathematics II
- MATH 6103 Computer Techniques and Numerical Methods

The decision as to whether a program will include a thesis, design project or problem report is to be made on an individual basis by the advisory committee at the time of filing the student's Plan of Study.

Academic Standards

Only the grades of A, B or C are accepted towards a graduate degree. A grade of U in any graduate course will suspend the student's enrollment subject to readmission as prescribed in the University catalog. Similarly, an accumulation of three C grades will result in suspension of the student's enrollment, subject to readmission to a program. A student in any graduate program is required to maintain satisfactory progress toward the degree. Continued enrollment is at all times subject to review on the basis of academic record and actions with regard to observance of University rules and regulations.

Admission to Candidacy Requirements

Upon completion of a substantial amount of graduate work and in no case later than the 8th instructional day of the semester in which the student expects to complete all requirements for the degree, the student shall file an Admission to Candidacy form to the Graduate School. This application is a checklist approved by the advisor, department chair, and the College Dean listing all coursework to be offered for the degree (including transfer credit and courses in progress). A tentative date for the comprehensive examination should be agreed upon and indicated on this application. The date should be realistic and allow ample time for completion and review of the thesis or project.

The student and faculty advisor will agree on the appointment of an advisory committee. The advisory

committee will be composed of at least three graduate faculty members. The graduate advisor will serve as chair of the committee. The committee is recommended by the department after appropriate consultation between the advisor and student.

Application for Degree

Student preparing to graduate must submit an online Application for Degree by the filing data specified in the University Academic Calendar. If a student does not graduate in the semester identified on the Application for Degree, then the student must update his/her Admission to Candidacy and submit a new Application for Degree for graduation in a subsequent semester.

Transfer Credit

At the time of admission, up to six hours of transfer credit may be accepted from an ABET accredited engineering institution.

Assistantships

Teaching and Research Assistantships (TAs and RAs, respectively) are available on a competitive basis.

Tuition Waivers

In-State and Out-of-State tuition support (Resident/Non-Resident Tuition Differentials, respectively) is available, on a competitive basis, to full time students with financial assistantships from UNC Charlotte.

COURSES IN MECHANICAL ENGINEERING AND ENGINEERING SCIENCE

MEGR 6000. Research Seminar. (1) Presentations on the current research in Mechanical Engineering, Engineering Science, and related fields. May be repeated for credit. (*Fall, Spring*)

MEGR 6090. Special Topics. (1-6) (For Post-Baccalaureate Students only) Directed study of current topics of special interest. May be repeated for credit. (*On demand*)

MEGR 6109. Biotechnology and Bioengineering. (3) Prerequisite: admission to a graduate program or consent of instructor(s). This interdisciplinary course discusses key issues in device design, and heat and mass transport with cell biology, molecular biology, and physiology to introduce students to technological innovations in biotechnology and bioengineering. Credit cannot be awarded for both MEGR 6109 and MEGR 8109. (*Spring, Alternate years*)

MEGR 6116. Fundamentals of Heat Transfer and Fluid Flow. (3) Prerequisite: MEGR 3114 or permission of department. A unified treatment of transfer operations developed in terms of physical rate processes; formulation

and solution of typical boundary value problems associated with heat, mass and momentum transfer. (*Spring*)

MEGR 6125. Vibrations of Continuous Systems. (3)

Prerequisite: MEGR 4143. Analysis of vibration of continuous linear elastic structures such as strings, rods, beams and plates with varying boundary conditions. Approximate solution techniques such as Rayleigh, Rayleigh-Ritz and Galerkin are presented. (*Spring*)

MEGR 6141. Theory of Elasticity I. (3) Prerequisite: MEGR 3221 or permission of department. Introduction to the theory of elastic media; the fundamentals of stress, strain, stress-strain relationships, compatibility and equilibrium. Applications to two- and three-dimensional problems. Structural mechanics and energy methods. (*Fall*)

MEGR 6166. Mechanical Behavior of Materials I. (3) Prerequisite: MEGR 3161 or equivalent or permission of department. Macroscopic and microscopic aspects of elastic and plastic deformation and fracture of engineering materials; applications of dislocation theory to an interpretation and control of mechanical properties; temperature, strain rate and texture effects. (*Spring*)

MEGR 6181. Engineering Metrology. (3) Prerequisite: MEGR 3282. Introduction to metrology and standards. Uncertainty, precision and accuracy in metrology. Measurement of size and form, computational methods in measurement of form. Measurement of surface texture and out of roundness. Machine tool and robot accuracy and calibration. Evaluation of screw threads and gears. Introduction to design of precision instruments. (*Fall*)

MEGR 6990. Industrial Internship. (1-3) Prerequisite: Completion of nine hours of graduate coursework. Full- or part-time academic year internship in engineering complementary to the major course of studies and designed to allow theoretical and course-based practical learning to be applied in a supervised industrial experience. Each student's program must be approved by their graduate program director. Requires a mid-term report and final report to be graded by the supervising faculty. (*On demand*)

MEGR 7090. Special Topics. (1-6) Directed study of current topics of special interest for Master's degree. May be repeated for credit. (*On demand*)

MEGR 7101. Transport Processes. (3) Prerequisite: permission of department. Unified field theory approach to the fluid transport of momentum, energy, mass and electrical charge. Statistical theories of turbulence and molecular transport. Multiphase systems, chemically reacting flows, ionized fluids, separation processes. (*On demand*)

MEGR 7102. Introduction to Continua. (3) Prerequisites: MEGR 2144, MEGR 3114, or permission of department. A unified treatment of those topics which are common to all continua. Stress, deformation and velocity fields,

constitutive equations and field equations. Representative applications in solid, fluid and electromagnetic continua, including interaction problems. (*On demand*)

MEGR 7108. Finite Element Analysis and Applications. (3)

Prerequisites: MEGR 6141 and MATH 6171 or permission of department. An introduction to the finite element method and its application to engineering problems. Application of the displacement methods to plane stress, plane strain, plate bending and axisymmetrical bodies. Topics may include but are not limited to: dynamics, heat conduction, and structural mechanics. (*Spring*)

MEGR 7110. Advanced Conductive Heat Transfer. (3)

Prerequisite: MEGR 3116. Theory of steady and unsteady heat conduction in isotropic and anisotropic media. Treatment of concentrated and distributed heat sources. Application of the finite difference and finite element methods. (*Fall*)

MEGR 7111. Advanced Engineering Thermodynamics. (3)

Prerequisites: MEGR 3112 and MATH 3142. Postulational treatment of the laws of thermodynamics. Equilibrium and maximum entropy postulates. Development of formal relationships and principles for general systems. Applications to chemical, magnetic, electric, and elastic systems. (*On demand*)

MEGR 7112. Radiative Heat Transfer. (3)

Prerequisite: MEGR 3116. Fundamentals of radiation heat transfer, analysis of gray body and wavelength dependent systems; radiation from gases at high temperature, and particulate-laden gases; combined radiation and conduction. (*On demand*)

MEGR 7113. Dynamics and Thermodynamics of Compressible Flow. (3)

Prerequisites: MEGR 3111 and 3114. Compressible flow equations, isentropic flow, normal shock waves, Fanno and Rayleigh line flows. Nonsteady one dimensional flow. (*Alternate years*)

MEGR 7114. Advanced Fluid Mechanics. (3) Prerequisite: MEGR 4112 or permission of department. Unified tensorial-theoretical treatment of the transport of mass, momentum, energy and vorticity in fluids. General theorems for inviscid and irrational flows. Viscous effects, boundary layer theory, nonlinear phenomena hydrodynamic instability and turbulence with applications. (*On demand*)

MEGR 7115. Convective Heat Transfer. (3)

Prerequisites: MEGR 3116 and MEGR 4112. Heat and momentum transfer prediction in channel flows and boundary layers. Differential equation methods for fully developed and entry length laminar tube flows. Similarity solution for laminar heat transfer. Superposition methods for non-uniform boundary conditions. Integral equations of the boundary layer, approximate and semiempirical methods of solution. (*Spring*)

MEGR 7118. Thermal Environmental Engineering. (3) Prerequisite: MEGR 3116. Application of the thermodynamic and heat transfer principles to the analysis of thermal environmental systems. Topics include thermodynamic properties of moist air, psychometric charts, transfer processes, heating and cooling of moist air coils, physiological effects of thermal environments, food processing and storage. (*Alternate years*)

MEGR 7119. Thermal Applications in Biomedical Engineering. (3) Prerequisite: permission of department. Application of thermodynamic and heat transfer principles to the analysis of biomedical systems. Topics include thermodynamic and transport properties of biological tissue, thermoregulation, design and use of cryosurgical probes, and numerical modeling methods. (*On demand*)

MEGR 7120. Bearing Design and Lubrication. (3) Prerequisite: MEGR 3222 or permission of department. Hydrodynamic lubrication, fluid film and rolling element bearings, design and control of gas and fluid lubricated bearings. (*On demand*)

MEGR 7121. Mechanism Analysis. (3) Prerequisite: MEGR 3221 or permission of department. Analysis of coplanar and spatial mechanisms, application of matrix methods in analysis of mechanisms, mobility analysis of mechanisms, rigid body guidance, computer aided analysis of mechanisms. (*Spring*) (*Evenings*)

MEGR 7122. Mechanism Synthesis. (3) Prerequisite: MEGR 7121 or permission of department. Synthesis of coplanar and spatial mechanisms, number and type synthesis, function generator, path generator, optimal synthesis of mechanisms, case studies in optimal design of mechanisms. (*Alternate years*)

MEGR 7123. Mechanical Design. (3) Prerequisite: MEGR 6141 or permission of department. Impact loading on critical sections, fatigue consideration, stress concentration, fluctuating stresses, failure analysis, contact stresses, industrial case studies. (*Alternate years*)

MEGR 7124. Introduction to Automatic Controls. (3) Prerequisite: permission of department. Emphasis on mechanical systems. Mathematical models and characteristics of control systems. Performance and stability of linear feedback systems. Root locus and frequency response techniques. State space methods. Design and compensation of control systems. (*Spring*)

MEGR 7126. Dynamics of Machinery. (3) Prerequisite: MEGR 3222 or permission of department. Application of dynamics of machinery, balancing of rigid and flexible rotors. Dynamics of spatial mechanisms. Computer-aided dynamic analysis of machinery. (*On demand*)

MEGR 7127. Computer-Aided Manufacturing. (3) Prerequisite: MEGR 3255 or permission of department. Topics covered include flowline production, numerical

control, computer aided process monitoring and control, group technology, flexible manufacturing, and material requirement planning. (*Alternate years*)

MEGR 7128. Control of Robotic Manipulators. (3) Cross-listed as ECGR 5151. Prerequisite: MEGR 4127 or ECGR 4151. Control of industrial robots including linear, nonlinear, and adaptive control of the motion of robots; plus control of forces and torques exerted by the end-effector. Additional topics include computer animation of the controlled behavior of industrial robots, actuators and sensors, robot vision and artificial intelligence, and control computer/robot interfacing. (*Spring*)

MEGR 7129. Structural Dynamics of Production Machinery. (3) Prerequisite: permission of department. The analytical study of dynamic characteristics of production machinery and the corresponding measurement, specification, and effects on machine performance. Machine tool vibration, machine tool stability, high speed machining. (*Spring*)

MEGR 7142. Theory of Elasticity II. (3) Prerequisite: MEGR 6141 and MATH 6172. Continuation of MEGR 6141 with additional topics in three-dimensional analyses. Topics include complex variable techniques, variational methods and numerical techniques. (*On demand*)

MEGR 7143. Inelastic Behavior of Materials. (3) Prerequisite: MEGR 6141 or permission of department. Introduction to plasticity and linear viscoelasticity. Topics include a study of yield criteria, plastic stress-strain relations, plastic hinge analysis, discrete viscoelastic models, the hereditary integral and selected boundary value problems. (*Alternate years*)

MEGR 7145. Advanced Topics in Dynamics. (3) Prerequisite: permission of department. Selected advanced topics in dynamics such as Lagrangian dynamics, vibrations of continuous media, stress wave propagation and motion measurement. (*On demand*)

MEGR 7146. Experimental Stress Analysis. (3) Prerequisite: MEGR 6141 or permission of department. Theoretical and experimental techniques of stress and strain analysis, with experimental emphasis on strain gages and instrumentation. Brittle coatings and photoelasticity are also considered. Two lectures and a two-hour lab per week. (*Alternate years*)

MEGR 7161. Atomic Processes in Solids. (3) Prerequisite: MEGR 2144 or permission of department. Processes dependent on large- and small-scale atomic motions leading to changes in material structures and properties. Theories of diffusion controlled and diffusionless transformations. Modern concepts in structure and property control. (*On demand*)

MEGR 7164. Diffraction/Spectroscopic Studies of Matter. (3) Prerequisite: permission of department. Atomic

arrangements in crystalline and non-crystalline forms of matter. Symmetry properties of crystals. Treatment of diffraction theory and experimental methods. X-ray diffraction and spectroscopic analysis of matter. (*Alternate years*)

MEGR 7165. Diffraction and NDE Methods in Materials Science. (3) Prerequisites: MEGR 3161 or equivalent or permission of department. Principles of diffraction and non-destructive evaluation methods and their applications to material problems; characterization of atomic and microstructural features and process induced defects in materials; evaluation of residual stress and texture effects; phase and elemental analysis; experimental methodologies. (*On demand*)

MEGR 7166. Deformation and Fracture of Materials. (3) Prerequisite: permission of department. Macroscopic and microscopic aspects of elastic and plastic deformation and fracture; applications of dislocation theory to an interpretation and control of mechanical properties; temperature, strain rate and texture effects. (*On demand*)

MEGR 7167. Mechanical Behavior of Materials II. (3) Prerequisite: MEGR 6166 or equivalent. Continuation of MEGR 6166; selection of topics to include further treatments of dislocation theory and its applications; analysis of fatigue and creep phenomena; strength of polymers and composites; statistical treatment of strength; materials design and failure analysis. (*Spring*)

MEGR 7172. Computational Methods in Engineering. (3) Prerequisite: MATH 6171 or permission of department. Numerical linear algebra, solution of systems of equations, numerical integration, differentiation and interpolation, root finding, numerical solution of partial differential equations by finite difference and finite element methods. (*On demand*)

MEGR 7182. Machine Tool Metrology. (3) Prerequisites: MEGR 2180, MEGR 3281, and MEGR 6181. Machine tool accuracy and performance testing. Modeling and measurement of volumetric accuracy using parametric error separation and quasi-static error models. Use of homogeneous transformations for error mapping. Linear and higher order thermal models. Error budgeting and management. Axis of rotation metrology, spindle accuracy, and cutting performance tests. Laboratory experience on CNC machine tools using heterodyne laser interferometers, capacitance gages, and other computer assisted sensor systems for machine checking. (*Spring*)

MEGR 7183. Design of Precision Machines and Instruments I. (3) Prerequisites: MEGR 3221 and MEGR 7182. Basic patterns in the design of precision machines and instruments. Design process, error assessment and examples, materials, sensors, drives, and controls for precision machines. Machine frames, sliding and rolling element bearings, flexures, hydrostatic bearings. Design

methodology, analysis of potential design, design case studies, and modeling of design alternatives. (*Fall*)

MEGR 7184. Design of Precision Machines and Instruments II. (3) Prerequisites: MEGR 7183. Application of principles, methodology, and analysis to specific design problems. Management of design. Class will design machine components, subsystems or whole instruments either individually or as members of design teams. Critical design reviews will be conducted. Designs will be quantitatively analyzed for conformance to design specifications and intent. (*Spring*)

MEGR 7281. Theory and Application of Computer-Aided Tolerancing. (3) Prerequisite: permission of department. Theory of geometric tolerance representation, analysis, and synthesis. Applications of geometric tolerances for design function and efficient metrology. Laboratory experience with mechanical design and tolerance analysis software. Implementation projects for tolerance analysis and synthesis. (*Fall, Alternate years*)

MEGR 7282. Computer-Aided Process Planning. (3) Prerequisite: permission of department. Theory and computing methods for the specification, manufacture, and verification of manufactured artifacts with a particular emphasis on precision engineering applications. Representation of engineering designs. Feature recognition. Generation of manufacturing and metrology instructions. Computer software implementation projects. (*Fall, Alternate years*)

MEGR 7283. Advanced Coordinate Metrology. (3) Prerequisite: MEGR 6181 or permission of department. Error compensation of coordinate measuring machines, algorithms and sampling methods used in data analysis. Probing systems, compensation of probing errors. Scanning coordinate measuring machines and their dynamic behavior. Performance testing of coordinate measuring machines. (*Spring, Alternate years*)

MEGR 7284. Advanced Surface Metrology. (3) Prerequisite: MEGR 6181 or permission of department. Constituents of surface texture, stylus, optical, atomic force microscope and other advanced methods of measuring surface texture. Two and three dimensional measurement of surfaces. Separation of form, waviness and roughness. Random process analysis techniques, use of transforms for filtering. Numerical evaluation of surface texture. Use of surface texture as fingerprint of the process. Relationship between function and surface texture. (*Spring, Alternate years*)

MEGR 7380. Tribology. (3) Prerequisite: permission of department. Surface properties and study of surfaces in contact. Friction and wear of materials. Tribological properties of solid materials. Fluid lubricated journal bearings, lubrication of highly loaded contacts, lubricating systems and bearing selection. (*On demand*)

MEGR 7480. Advanced Manufacturing Processes and Equipment. (3) Prerequisite: permission of department. Detailed analytical treatment of manufacturing materials and processes. Forming processes (forging, extrusion, rolling, drawing, bending, shearing), casting processes, metal cutting processes (turning, boring, drilling, shaping, milling), tool materials, joining processes, automation. (*On demand*)

MEGR 7892. Individual Study and Projects. (1-6) Individual investigation and exposition of results. May be repeated for credit. (*On demand*)

MEGR 7893. Advanced Topics in Precision Engineering. (3) Prerequisite: permission of department. Selected topics in precision control, materials for precision engineering, precision manufacturing, precision measurement, advanced analytical and numerical methods used in precision engineering (may be repeated as the topics vary and with the approval of the department). (*On demand*)

MEGR 7991. Graduate Master Thesis Research. (1-6) Individual investigation culminating in the preparation and presentation of a thesis. May be repeated for credit (*Fall, Spring*)

MEGR 7999. Master's Degree Graduate Residency Credit. (1) Required of all master's students not enrolled in other graduate courses who are working on or defending thesis/projects and/or are scheduled for comprehensive examinations. (*Fall, Spring*)

8000 level courses are for Ph.D. students only

MEGR 8000. Research Seminar. (1) Presentations on the current research in Mechanical Engineering, Engineering Science, and related fields. Required for all doctoral students in the MEES program. May be repeated for credit. (*Fall, Spring*)

MEGR 8090. Special Topics. (1-6) Directed study of current topics of special interest for Ph.D. degree. May be repeated for credit (*On demand*)

MEGR 8101. Transport Processes. (3) See MEGR 7101 for Course Description.

MEGR 8102. Intro to Continua. (3) See MEGR 7102 for Course Description.

MEGR 8108. Finite Element Analysis and Applications. (3) See MEGR 7108 for Course Description.

MEGR 8109. Biotechnology and Bioengineering. (3) See MEGR 6109 for Course Description.

MEGR 8110. Advanced Conductive Heat Transfer. (3) See MEGR 7110 for Course Description.

MEGR 8111. Advanced Engineering Thermodynamics. (3) See MEGR 7111 for Course Description.

MEGR 8112. Radiative Heat Transfer. (3) See MEGR 7112 for Course Description.

MEGR 8113. Dynamics and Thermodynamics of Compressible Flow. (3) See MEGR 7113 for Course Description.

MEGR 8114. Advanced Fluid Mechanics. (3) See MEGR 7114 for Course Description.

MEGR 8115. Convective Heat Transfer. (3) See MEGR 7115 for Course Description.

MEGR 8116. Fundamentals of Heat Transfer and Fluid Flow. (3) See MEGR 6116 for Course Description.

MEGR 8118. Thermal Environmental Engineering. (3) See MEGR 7118 for Course Description.

MEGR 8119. Thermal Applications in Biomedical Engineering. (3) See MEGR 7119 for Course Description.

MEGR 8120. Bearing Design and Lubrication. (3) See MEGR 7120 for Course Description.

MEGR 8121. Mechanism Analysis. (3) See MEGR 7121 for Course Description.

MEGR 8122. Mechanism Synthesis. (3) See MEGR 7122 for Course Description.

MEGR 8123. Mechanical Design. (3) See MEGR 7123 for Course Description.

MEGR 8124. Introduction to Automatic Controls. (3) See MEGR 7124 for Course Description.

MEGR 8125. Vibrations of Continuous Systems. (3) See MEGR 6125 for Course Description.

MEGR 8126. Dynamics of Machinery. (3) See MEGR 7126 for Course Description.

MEGR 8127. Computer-Aided Manufacturing. (3) See MEGR 7127 for Course Description.

MEGR 8128. Control of Robotic Manipulators. (3) See MEGR 7128 for Course Description.

MEGR 8129. Structural Dynamics of Production Machinery. (3) See MEGR 7129 for Course Description.

MEGR 8141. Theory of Elasticity I. (3) See MEGR 6141 for Course Description.

MEGR 8142. Theory of Elasticity II. (3) See MEGR 7142 for Course Description.

MEGR 8143. Inelastic Behavior of Materials. (3) See MEGR 7143 for Course Description.

MEGR 8145. Advanced Topics in Dynamics. (3) See MEGR 7145 for Course Description.

MEGR 8146. Experimental Stress Analysis. (3) See MEGR 7146 for Course Description.

MEGR 8161. Atomic Processes in Solids. (3) See MEGR 7161 for Course Description.

MEGR 8164. Diffraction/Spectroscopic Studies of Matter. (3) See MEGR 7164 for Course Description.

MEGR 8165. Diffraction and NDE Methods in Materials Science. (3) See MEGR 7165 for Course Description.

MEGR 8166. Mechanical Behavior of Materials I. (3) See MEGR 6166 for Course Description.

MEGR 8167. Mechanical Behavior of Materials II. (3) See MEGR 7167 for Course Description.

MEGR 8168. Deformation and Fracture of Materials. (3) See MEGR 7166 for Course Description.

MEGR 8172. Computational Methods in Engineering. (3) See MEGR 7172 for Course Description.

MEGR 8182. Machine Tool Metrology. (3) See MEGR 7182 for Course Description.

MEGR 8183. Design of Precision Machines and Instrument I. (3) See MEGR 7183 for Course Description.

MEGR 8184. Design of Precision Machines and Instrument II. (3) See MEGR 7184 for Course Description.

MEGR 8281. Theory and Application of Computer-Aided Tolerancing. (3) See MEGR 7281 for Course Description.

MEGR 8282. Computer-Aided Process Planning. (3) See MEGR 7282 for Course Description.

MEGR 8283. Advanced Coordinate Metrology. (3) See MEGR 7283 for Course Description.

MEGR 8284. Advanced Surface Metrology. (3) See MEGR 7284 for Course Description.

MEGR 8380. Tribology. (3) See MEGR 7380 for Course Description.

MEGR 8480. Advanced Manufacturing Processes and Equipment. (3) See MEGR 7480 for Course Description.

MEGR 8892. Individual Study and Projects. (1-6) See MEGR 7892 for Course Description.

MEGR 8893. Advanced Topics in Precision Engineering. (3) See MEGR 7893 for Course Description.

MEGR 8990. Industrial Internship. (1-3) See MEGR 6990 for Course Description.

MEGR 8999. Doctoral Dissertation Research. (1-9) Individual investigation culminating in the preparation and presentation of a doctoral dissertation. (*On demand*)

MEGR 9999. Doctoral Degree Graduate Residency Credit. (1)



College of Health and Human Services

www.health.uncc.edu

Dean: Karen Schmaling
Associate Dean: Jane Neese

In the College of Health and Human Services at the University of North Carolina at Charlotte, students and faculty help chart the course for health care and social services throughout the region. With excellence in educational programs, research, community service, and clinical practice, the college plays an important role in developing and implementing high quality health care and social service practices. As an interdisciplinary college, many opportunities exist for student and faculty collaboration in teaching and research. Within the college's diverse graduate curricula, faculty and student research also is a key component to successful student-learning outcomes. Additionally, the college incorporates information technology standards in all courses and offers online learning opportunities in many of its graduate programs.

Graduate Degree Programs

- Master of Health Administration
- Master of Science in Clinical Exercise Physiology
- Master of Science in Public Health
- Master of Science in Nursing: Adult Nurse Practitioner
- Master of Science in Nursing: Community/Public Health Nursing
- Master of Science in Nursing: Family Nurse Practitioner
- Master of Science in Nursing: Nurse Educator
- Master of Science in Nursing: Nurse Administrator
- Master of Science in Nursing: Nurse Anesthesia
- Master of Social Work
- Doctor of Philosophy in Health Services Research

Graduate Non-Degree Programs

- Certificate in Community Health
- Certificate in Nurse Anesthesia (Post-Master's Certificate)

- Certificate in Nursing Education
- Certificate in Nursing Administration
- Certificate in Nursing: Family Nurse Practitioner
- Certificate in Nursing: Adult Nurse Practitioner

Clinical Exercise Physiology

- M.S. in Clinical Exercise Physiology

Department of Kinesiology

226A Belk Gym

704-687-4695

<http://kinesiology.uncc.edu>

Coordinator

Dr. Michael J. Turner

Graduate Faculty

Mitchell L. Cordova, Professor

Reuben Howden, Assistant Professor

Tricia J. Hubbard, Assistant Professor

J. Timothy Lightfoot, Professor

Susan K. Tsivitse, Assistant Professor

Michael J. Turner, Associate Professor

Erik A. Wikstrom, Assistant Professor

MASTER OF SCIENCE IN CLINICAL EXERCISE PHYSIOLOGY

The Master of Science in Clinical Exercise Physiology is designed to prepare students to become Registered Clinical Exercise Physiologists. Clinical Exercise Physiologists are employed in inpatient and outpatient clinical/rehabilitation settings (e.g. Cardiopulmonary Rehab programs), general wellness/fitness commercial and corporate settings, and industrial settings that provide health care services for both diseased and healthy populations. Through a blend of classroom instruction and clinical experience, the degree program teaches a wide variety of specific health care skills, knowledge, and behaviors within the cardiovascular, pulmonary, metabolic, musculoskeletal, neuromuscular, and immunologic practice areas. Students will be required to complete a 30 credit hour core of classes and an additional 6 credit hours of electives. **A complete sequence of courses can be found at <http://kinesiology.uncc.edu>.**

Additional Admissions Requirements

- 1) Satisfactory scores on either the Graduate Record Examination (GRE) or the Miller Analogies Test (MAT)
- 2) Cumulative GPA of 3.0 or better in all college course work completed in the Junior and Senior year of their undergraduate program
- 3) Successful completion (grade of C or better) of a minimum of 4 credit hours of Anatomy and Physiology, 3 credit hours of Exercise Physiology, and 3 credit hours of Exercise Prescription

Degree Requirements

The program requires a minimum of 36 semester hours of graduate credit including 24 hours of core courses, a minimum of 3 hours of Clinical Practicum, 6 hours of electives, and 3 hours of either Thesis or additional elective course.

Assistantships

Positions as a research assistant or teaching assistant may be available. Grant funded assistantships may be available as well. Students seeking assistantships should contact the Graduate Coordinator of the Clinical Exercise Physiology program. In general, graduate assistantship awards for the academic year are made by the preceding April 15.

Clinical Practicum

As a part of the curriculum, each student must complete, *at a minimum*, 3 hours of Clinical Practicum. Students, if they choose the Comprehensive Exam option as their capstone experience, are required to complete an additional 3 hours of Clinical Practicum. Each Practicum credit is equivalent to 200 clinical hours. Clinical practicum usually begin in the second semester of the student's program and are arranged through the Practicum Supervisor within the Department of Kinesiology.

Core Courses (24 hours)

- KNES 6120 Advances in Clinical Exercise Physiology (3)
- KNES 6121 Clinical Practice in Exercise Physiology (3)
- KNES 6134 Exercise Prescription for Cardiopulmonary & Metabolic Disorders (3)
- KNES 6232 Physiology of Human Aging (3)
- KNES 6280 Advanced Exercise Physiology (3)
- KNES 6285 Advanced Cardiopulmonary Physiology (3)
- KNES 6292 Exercise Prescription for Musculoskeletal Disorders (3)
- NURS 6160 Research Methods in Health Professions (3)

Clinical Practicum (3-6 hours)

- KNES 6490 Advanced Practicum in Clinical Exercise Physiology (1) (taken 3 times)

Capstone Experience (student is required to complete one of two options) (3 hours)

- OPTION A: KNES 6900 Graduate Thesis (3)
- OPTION B: One Elective Course (3) AND satisfactory completion of comprehensive examination

Elective Courses (at least 6 hours)

- KNES 6469 Directed Independent Study (3)
- KNES 6899 Special Topics in Exercise Physiology (3)
- HLTH 6202 Community Epidemiology (3)
- HLTH 6222 Methods in Community Health (3)
- BIOL 5171 Cell Physiology (3)
- BIOL 5199 Molecular Biology (3)
- BIOL 5260 Population Genetics (3)
- BIOL 6273 Advanced Human Physiology (3)
- BIOL 6274 Pathophysiology (3)

Capstone Experience

Near the completion of the program of study, each student is required to select either a research thesis or choose an elective course for 3 credit hours and schedule to take the comprehensive examination through the Graduate Coordinator. The student is responsible for organizing a committee of three faculty members (and an outside community person if appropriate) to supervise, monitor and evaluate the project or thesis.

Advising

Upon acceptance into the program, an academic advisor is assigned to each student. Students are expected to meet with their advisors on a regular basis to plan their progression through their program of study. Any course substitution must be approved by the academic advisor.

Research Opportunities/Experiences

A range of research opportunities exist in the Department of Kinesiology for qualified students. Students are encouraged to become engaged in the research focus of the department.

Tuition Waivers

Tuition waivers may be available through a variety of sources. Students interested in pursuing tuition waivers should contact the Graduate Coordinator in the-semester *prior* to enrolling for courses.

Financial Aid/Financial Assistance

A wide range of opportunities for financial aid/assistance is available to qualifying students, which may be accessed through the financial aid office. See the financial information section of this graduate catalog for more information on the opportunities that are available, and how to contact the financial aid office.

Program Certifications/Accreditations

Completion of the clinical exercise physiology specialty qualifies the graduate to take the Clinical Exercise Physiology Registry Examination (RCEP) administered by the American College of Sports Medicine.

COURSES IN CLINICAL EXERCISE PHYSIOLOGY (KINESIOLOGY)

KNES 6120. Advances in Clinical Exercise Physiology. (3)

This course introduces students to concepts and topics associated with Clinical Exercise Physiology, including areas of practice in Clinical Exercise Physiology and professional development. *(Fall)*

KNES 6121. Clinical Practice in Exercise Physiology. (3)

Knowledge and skills required in the clinical setting including operational standards, examination of current drug therapies, and legal and social considerations related to practice as a Clinical Exercise Physiologist. *(Fall)*

KNES 6134. Exercise Prescription for Cardiopulmonary and Metabolic Disorders. (3)

Study of responses and adaptations to exercise, assessment techniques, exercise prescription, leadership and programming. *(Spring)*

KNES 6232. Physiology of Human Aging. (3)

This course focuses on the normal physiological alterations that occur as the human progresses from a young adult to the latter stages of life. Special attention is given to interventions commonly promoted to combat the physiological changes that result from aging. *(Fall)*

KNES 6260. Clinical Exercise Nutrition. (3)

Principles of nutrition, dietary guidelines, dietary relationships to diseases and health, special populations, computerized dietary analysis. *(On demand)*

KNES 6280. Advanced Exercise Physiology. (3)

Advanced study of the functioning of physiological systems during exercise with emphasis on current literature and research. *(Spring)*

KNES 6285. Advanced Cardiopulmonary Physiology. (3)

This course is designed to develop a thorough understanding of cardiovascular physiology, ECG interpretation, and health-related applications. This course examines in detail, the various parameters of the cardiovascular system, the implication of disease and structural abnormalities to these parameters, and the relationship of cardiovascular function to exercise adaptation. Emphasis will be placed on usage of the information in the clinical setting. *(Spring)*

KNES 6292. Exercise Prescription for Musculoskeletal Disorders. (3)

Advanced study of the clinical applications of common therapeutic modalities and rehabilitation in the treatment of athletic related injuries. *(Summer)*

KNES 6490. Advanced Practicum in Clinical Exercise Physiology. (1)

Prerequisite: Permission of instructor. Acquisition and application of knowledge, skills, and abilities necessary for the Registered Clinical Exercise Physiologist while gaining experiential hours in an appropriate clinical setting. Three (3) credit hours of Advanced Practicum are required for graduation; this course may be repeated for up to 6 credit hours. *(Every semester)*

KNES 6469. Directed Independent Study. (1-3)

Directed study in areas of specialization in Clinical Exercise Physiology and related fields. Offered on a *Pass/No Credit* basis only. *(Every semester)*

KNES 6899. Special Topics in Kinesiology. (1-6)

Topics and special problems related to issues, practices or sufficient trends in Kinesiology. Institutes, workshops, seminars and independent studies. Course may be repeated for credit as topics vary. *(Every semester)*

KNES 6900. Research and Thesis in Kinesiology. (3)

Prerequisite: Satisfactory completion of research design course; completion of at least 24 hours of graduate program; permission of instructor overseeing thesis research. Design, implementation, presentation, and evaluation of an approved research project in student's specialty area. The applied project is of the student's own design under the supervision of an advisor and graduate committee. Graded *Pass/No Credit* only. *(Every semester)*

KNES 7999. Master's Degree Graduate Residency Credit. (1)

Independent research. Required of all master's degree students who are working on a thesis but not enrolled in other graduate courses. *(Every semester)*

Health Administration

• Master of Health Administration (MHA)

Department of Public Health Sciences

431 College of Health and Human Services

704-687-7191

<http://publichealth.uncc.edu>

Program Director

Sarah B. Laditka, PhD, Associate Professor

Graduate Faculty

William Brandon, PhD, Adjunct Professor

Cynthia Cassell, PhD, Assistant Professor

Larissa Huber, PhD, Assistant Professor

James N. Laditka, DA, PhD, Associate Professor

Elena Platonova, PhD, Assistant Professor

Gerald Pyle, PhD, Emeritus Professor

James Studnicki, PhD, Professor

Rosemarie Tong, PhD, Adjunct Professor

Professional Affiliates

Robert L. Barber, DHA, Director, Financial Services,
Carolinas HealthCare System

Christopher Blanchette, PhD, Lovelace Respiratory
Research Institute

Anna Ejakova, PhD, Research Assistant, Wayne State
University

Peggy Burke, MBA, Director of Corporate Audit, Novant
Health

Anna Cain, MBA, Practice Manager, Mecklenburg Medical
Group

David Dougherty, MBA, Director of Human Resources,
Southminster, Inc.

Thomas S. Elmore, MBA, FACHE, Vice President of
Growth & Development, Novant Health Inc.

Agnes Ozelkan, PhD, Instructor, UNC Charlotte

MASTER OF HEALTH ADMINISTRATION (MHA)

The Master of Health Administration (MHA) degree prepares students for exciting careers in health services management for a variety of health related institutions in an evolving health care delivery system. Structured to meet the highest professional and accreditation standards the program is designed to address the needs of current health care managers, clinical professionals who anticipate future administrative responsibilities, and pre-professionals who wish to prepare for an entry level career in health care administration.

The Master of Health Administration is a 51 hour degree program. Students take 45 hours of core courses including a 3 credit hours internship, and 6 hours of elective courses.

Administratively located within the Department of Public Health Sciences, it is an interdisciplinary program with courses taught by faculty from the College of Liberal Arts and Sciences, the Belk College of Business and the College of Health and Human Services. The Master of Health Administration degree program is fully accredited by the Commission on Accreditation of Healthcare Management Education (CAHME); and the Department of Public Health Sciences is a member of the Association of University Programs in Health Administration.

Students may enroll in the Master of Health Administration program on a full-time or part-time basis. Classes are scheduled in the evenings, and on weekends mainly at UNC Charlotte Uptown, and for selected courses at the UNC Charlotte main campus.

Master's prepared health service managers may work as chief or executive administrators, assistants to chief executives, or as directors and managers of departments and units. Some examples of the settings where MHA graduates work include: hospitals and hospital systems, physician practices and clinics, long term care facilities, managed care organizations, consulting firms, pharmaceutical and biotechnology companies, local/state/federal health agencies, health insurance companies, and medical supply and equipment manufacturers.

Additional Admission Requirements

To be considered for admission to graduate study in Health Administration, a student must present the following requirements in addition to those required by the Graduate School.

- 1) Acceptable scores on the verbal and quantitative portions of the Graduate Record Exam (GRE) or the Graduate Management Admission Test (GMAT).
- 2) An essay describing the applicant's experience and objective in undertaking graduate study in health administration.
- 3) Basic computer skills including word processing and use of spread sheets.

Applicants with a variety of undergraduate degree specializations have the potential to be successful in the program. Individuals with records of high quality professional experience who do not fulfill the formal requirements should discuss with the Director of the Health Administration Program other factors that may have a bearing on admission.

Degree Requirements

Courses

Each student is required to complete 45 hours (15 courses including the Internship) in the core curriculum. These courses offer a basic body of knowledge, skills and values relevant to health services administration. Additionally, students will select 6 credit hours (2 graduate courses) in elective studies. A student may choose to use the two elective courses to complete a thesis. Students are

encouraged to select courses that meet individual professional needs. Electives are available in several areas including management specialties, long term care, community health, and non-profit organization.

Core Courses (45 hours)

- HADM 6100 Introduction to the US Health Care System (3)
- HADM 6104 Health and Disease (3)
- HADM 6108 Decision Analysis in Health Care (3)
- HADM 6116 Accounting for Health Care Management (3)
- HADM 6120 Health Economics (3)
- HADM 6124 Marketing in Health Care (3)
- HADM 6128 Human Resources Management (3)
- HADM 6134 Quality and Outcomes Management in Health Care (3)
- HADM 6138 Health Care Finance (3)
- HADM 6142 Health Policy Development (3)
- HADM 6145 Organization Behavior in Health Care (3)
- HADM 6146 Information Resources Management (3)
- HADM 6150 Health Law and Ethics (3)
- HADM 6154 Strategic Management of Health Services Organizations (3)
- HADM 6400 Internship (3)

Sample Electives (6 hours)

- HADM 6200 Health Insurance & Managed Care (3)
- HADM 6212 Health, Aging and Long Term Care (3)
- HADM 6216 Long Term Care Administration (3)
- HADM 6204 Trends and Issues in Health Administration (3)
- GRNT 6211 Administration of Aging Programs (3)
- SOCY 6138 Social Organization of Health Care (3)

Assistantships

Positions as a graduate administrative assistant may be available. Grant funded assistantships may be available as well. Students seeking assistantships should contact the Office Assistant assigned to the Department of Public Health Sciences.

Internships

Each student in the program is required to demonstrate professional experience in the health care delivery system. This requirement may be demonstrated through 1) a full-time administrative position in a health care delivery setting, or 2) an approved internship in a health care delivery administrative setting. Students who have no professional experience in a health care setting are required to undertake an internship experience. Each student must complete an MHA Internship Information form, describing professional experience or internship preference, and submit it to the Director of the MHA Program. Students who require an internship register for HADM 6400 Internship on a Pass/No Credit basis. Students who obtain an exemption from completing an internship are required to take an elective course as a substitute in order to complete the 51 hours needed to graduate.

Electives

Students will enroll in two elective courses and are encouraged to select courses that will complement their professional interest and educational goals. Elective courses are offered each semester by the Health Administration program or may be selected from other graduate programs to meet particular student interest.

Advising

The Director of the MHA Program is the advisor for all students. Students are expected to meet with the MHA Director on a regular basis to plan their progression through their program of study. Any course substitutions and selection of electives must be approved by the MHA Director. With the approval of the MHA Director students may have other MHA graduate faculty serve as their academic advisor.

Thesis

Students may elect a two-course thesis sequence to produce and defend independent research relevant to health services administration that demonstrates a contribution to professional knowledge through systematic investigation. This course requires permission of the graduate faculty member who would direct the study as well as permission of the Director of the MHA Program prior to registration.

Financial Aid/Financial Assistance

A wide range of opportunities for financial aid/assistance is available to qualifying students, which may be accessed through the financial aid office. See the Financial Information section of this *Graduate Catalog* for more information on the opportunities that are available, and how to contact the financial aid office.

COURSES IN HEALTH ADMINISTRATION

HADM 6000. Topics in Health Administration. (3) Intensive study of a topic in health administration. The topic of investigation may vary from semester to semester. May be repeated for credit. (*On demand*)

HADM 6100. Introduction to the US Health Care System. (3) Crosslisted as MPAD 6172. Overview of health care delivery in the United States including organizational structures, financing mechanisms and delivery systems, with particular attention to program formation. (*Fall or Spring*) (*Evenings or Weekends*)

HADM 6104. Health and Disease. (3) Principles and methods of epidemiology including definitions and models of health, illness, and disease; modes of transmission of clinically important infectious agents; risk factors and chronic diseases; and insights into existing studies and

paradigms of health promotion and disease prevention. *(Fall or Spring) (Evenings or Weekends)*

HADM 6108. Decision Analysis in Health Care. (3) The study of selected quantitative management tools useful in the analysis of managerial decisions. Includes a review of basic descriptive and inferential statistics, applied probability distributions, forecasting methods, statistical process control, queuing, transportation and assignment modeling, and linear programming. The emphasis is on applying quantitative decision making methods to the operational problems facing health care organizations. Familiarity with computers and computer software will be important for success in this course. *(Fall or Spring) (Evenings or Weekends)*

HADM 6116. Accounting for Health Care Management. (3) Basic concepts and techniques of collecting, processing and reporting financial information relevant to health care institutions. Emphasizes a conceptual understanding of financial accounting, technical tools of cost accounting, including budget preparation and analysis, and interpretation of financial statements. *(Fall or Spring) (Evenings or Weekends)*

HADM 6120. Health Economics. (3) Examination of the economic context of health services delivery and policies, and application of economic concepts to the health care sector including supply and demand, elasticity, regulation, competition and cost effectiveness analysis. *(Fall or Spring) (Evenings or Weekends)*

HADM 6124. Marketing in Health Care. (3) Provides an in-depth understanding of the essential concepts of marketing and their application to health care. Students gain a working knowledge of marketing tools and how to use them in the context of health care. Students build practical applied skills in analyzing health care marketing problems and developing health care marketing programs and strategies. Students also expand their understanding of the differences and similarities between health services and social marketing. *(Fall or Spring) (Evenings or Weekends)*

HADM 6128. Human Resources Management. (3) Examines human resources management as it applies to health services institutions, including compensation benefits, personnel planning, recruitment, selection, training and development, employee appraisal and discipline, union-management relations and quality management. *(Fall or Spring) (Evenings or Weekends)*

HADM 6134. Quality and Outcomes Management in Health Care. (3) Examination of the concepts and practices of quality management, performance improvement, and assessment of outcomes in health care delivery settings. Designed to provide an in-depth understanding of basic concepts and frameworks and of their applicability and relevance in specific situations. Examples of topics to be covered include: process reengineering, service improvement, continuous quality improvement, accreditation standards, patient satisfaction, outcome

measurement, teamwork, and case management. *(Fall or Spring) (Evenings or Weekends)*

HADM 6138. Health Care Finance. (3) Prerequisite: HADM 6116. Fundamental financial management concepts and tools for health care institutions, including financial statements and attributes, capital acquisition and allocation, investment analysis, capital and cash flow management and contractual relationships. *(Fall or Spring) (Evenings or Weekends)*

HADM 6142. Health Policy Development. (3) Crosslisted as MPAD 6174. Prerequisite: HADM 6100/MPAD 6172. Examination of the formulation, adoption and implementation of public policy for health services delivery and health care through federal, state, and local political processes. *(Fall or Spring) (Evenings or Weekends)*

HADM 6145. Organization Behavior in Health Care. (3) Introduction to organizational theory with applications to health care systems, including organizational design and inter-organizational networks/alliances. Examination of communication and leadership skills development, including conflict, labor and dispute management. *(Fall or Spring) (Evenings or Weekends)*

HADM 6146. Information Resources Management. (3) Crosslisted as NURS 6162. A study of the use of information management to improve the delivery of health care. Information resource management includes methods and practices to acquire, disseminate, store, interpret and use information to provide health care in a more efficient, effective and economical manner. Emphasis is placed upon information as central to the ongoing operations and strategic decisions of health care organizations. *(Fall or Spring) (Evenings or Weekends)*

HADM 6150. Health Law and Ethics. (3) Analysis of ethical and bioethical problems confronting health care delivery systems. Selected legal principles and their application to the health care field, including corporate liability, malpractice, informed consent and governmental regulation of health personnel and health facilities. *(Fall or Spring) (Evenings or Weekends)*

HADM 6154. Strategic Management of Health Services Organizations. (3) Prerequisites: All core courses except HADM 6146 and HADM 6150. Analysis of strategic planning, managing and marketing concepts, techniques and tools within the health care industry, including organizational capability analysis and business plan development. *(Fall or Spring) (Evenings or Weekends)*

HADM 6200. Health Insurance and Managed Care. (3) Fundamentals of managed health care systems, including risk arrangements, compensation, incentives, quality assurance, financing and public programs. *(On demand)*

HADM 6204. Trends and Issues in Health Administration. (3) Crosslisted as MPAD 6176.

Examination of current issues confronting health care managers and an assessment of programs and management responses to emerging trends in the health care field, including delivery systems, marketing/competition, financing and/or epidemiological changes. *(On demand)*

HADM 6208. Research Methods for Health Care Administration. (3) Prerequisite: undergraduate statistics course. Study of selected statistical techniques useful in the analysis of managerial decisions and interpretation and evaluation of research. Introduction to systems analysis and selected operations research techniques as applied to problem solving and decision making in health care institutions. *(Fall or Spring) (Evenings or Weekends)*

HADM 6212. Health, Aging and Long Term Care. (3) This course offers an overview of the health status of an aging U.S. population, with a focus on long-term care. Topics include: demographics of an aging society, health status of older people, societal values related to aging and long-term care, informal care giving, the formal service provision system, relevant public policies, and challenges for the future. *(Fall or Spring) (Evenings or Weekends)*

HADM 6216. Long Term Care Administration. (3) This course provides an overview of the long-term care system, with an emphasis on older persons. Class content includes the exploration of issues surrounding the provision of long-term care, identification of the various components of the long-term care system, and discussion of the role of health administration within the long-term care system. *(Fall or Spring) (Evenings or Weekends)*

HADM 6400. Internship. (3) Prerequisite: Completed HADM 6100 and 15 additional hours of core course requirements. The purpose of the health administration internship is to offer administrative experience in a healthcare setting for students. The initial assumption is made that students participating in the internship experience have had limited hands-on exposure to healthcare administration. Graded on a Pass/No Credit basis. *(Fall, Spring, Summer)*

HADM 6800. Independent Study. (1-3) Guided individual study in an issue related to health administration arranged with a faculty member or supervised experience in an administrative setting in a program or entity within the health care delivery system. Graded on a Pass/No Credit basis. *(On demand)*

HADM 6999. Thesis. (3) Production of independent research relevant to health administration which demonstrates contribution to professional knowledge through systemic investigation. Pass/In Progress grading. *(Fall, Spring, Summer)*

HADM 7999. Master's Degree Graduate Residency Credit. (1) Prerequisite 6999. Continuation of thesis on a topic of significance in health administration. *(Fall, Spring, Summer)*

Health Services Research

- **Ph.D. in Health Services Research**

College of Health and Human Services

704-687-7035

<http://publichealth.uncc.edu>

Director

James N. Laditka, Ph.D., D.A., Public Health Sciences

Graduate Teaching Faculty

Bruce Arrigo, Ph.D., Criminal Justice & Criminology

Suzanne Boyd, Ph.D., Social Work

Bill Brandon, Ph.D., Public Policy, PHS Adjunct

Mitchell Cordova, Ph.D., Kinesiology

Andrew Harver, Ph.D., Public Health Sciences

James Laditka, Ph.D., D.A., Public Health Sciences

Sarah Laditka, Ph.D., Public Health Sciences

Mary Nies, Ph.D., Nursing

Theresa Scheid, Ph.D., Sociology, PHS Adjunct

Karen Schmaling, Ph.D., Public Health Sciences

Jim Studnicki, Ph.D., Public Health Sciences

Laura Talbot, Ph.D., Ed.D., Nursing

Rosemarie Tong, Ph.D., Philosophy

PH.D. IN HEALTH SERVICES RESEARCH

This interdisciplinary program in Health Services Research will include course work in biostatistics, health economics, healthcare organizational structures and processes, epidemiology, health policy, personal behaviors, and social factors that affect access to health care, quality and cost of health care, and health outcomes. Graduates will be prepared to conduct interdisciplinary research utilizing quantitative methods supplemented with qualitative methods to advance knowledge to support innovations in health care delivery systems and health policy. All students are required to complete a series of core and special emphasis courses individually developed between the student and their advisor. The cornerstone of the program is the student's dissertation, which is expected to be a significant contribution based on original and independent research leading to publications in peer reviewed, indexed journals. Graduates are prepared to work in healthcare delivery systems, academia, or government positions.

Additional Admission Requirements

In addition to the general requirements for admission to the graduate school, the following are required for study in the PhD Program in Health Services Research:

- 1) Master's Degree from an accredited university in a health-related field
- 2) An overall graduate grade point average (GPA) of at least 3.5 out of 4.0 from an accredited graduate program
- 3) Minimum score of 500 on the verbal and quantitative sections of the Graduate Record Examination (GRE); submission of the analytic writing score
- 4) Graduate level research methodology and introduction to statistics courses
- 5) An essay that addresses professional and academic experience, motivation for pursuing the degree, specialty area of emphasis to pursue in the program, and career goals following the program
- 6) A score on the Test of English as a Foreign Language (TOEFL) examination, which meets university requirements for those applicants whose native language is not English
- 7) An interview with the Director or their designee either in person or by telephone may be required at the discretion of the Director
- 8) Three letters of reference, at least one of which is from a former graduate faculty member and one from a former supervisor

Degree Requirements

The Ph.D. acknowledges the value of course work for background and preparatory to conducting research. This program emphasizes courses in research methods and analysis, as well as experiences working with faculty on research to support the development of research skills in order to carry out the dissertation on a significant research problem in the area of health services research.

Total hours required

The program requires 64 post-master's credit hours. Because of the interdisciplinary nature of the program, all students will be required to take the general curriculum that includes a two year sequence of core courses as shown below.

Interdisciplinary Theoretical Base: 15 semester hours. Includes Introduction to Health Services Research, Health Policy, Economics of Health and Healthcare, Health Care Systems and Delivery, and Analytical Epidemiology. There is a prerequisite of a Master's level course in Epidemiology for the Analytical Epidemiology course and a Master's level course in Health or Social Policy for the Health Policy course. If not completed before admission, these courses must be completed before the student takes the courses for which each is a prerequisite. These courses cannot be applied toward the Area Emphasis requirement.

Methods and Methodological Issues: 22 semester hours. Includes Applied Biostatistics: Regression, Design of Health Services Research, Applied Biostatistics: Multivariate,

Advanced Design of Health Services Research, Large Data Sets and Health Services Research, Program Evaluation, Outcomes and Quality and four seminars in Research Ethics, Implementation of Health Services Research, Health Disparities, and Grant Proposal Writing in Health Services Research

Additionally, 9 semester hours in an area of emphasis. Students each develop a set of courses in a chosen area of emphasis that is designed mutually with their advisor. These courses may be at the Master's or Doctoral level in areas such as research methods, mental health, gerontology, public policy, or health disparities.

Dissertation, 18 semester hours.

Proportion of Courses Open Only to Doctoral Students

Health Services Research Program courses are only open to doctoral students, except with written approval of the instructor and the Director. Students from other university doctoral programs may enroll.

Grades Required

A student must maintain a cumulative average of 3.0 in all course work taken in the program. The seminars will be graded on a Pass/Unsatisfactory basis and therefore will not be included in the cumulative average. An accumulation of two C grades will result in termination of the student's enrollment in the doctoral program. A second failure in any of the following results in dismissal from the program the candidacy examination; the dissertation proposal defense; or final dissertation defense. If a student makes a grade of *U* or *NC* on any course, enrollment will be terminated. A doctoral student whose enrollment has been terminated because of grades is ineligible to register in any semester or summer session.

Amount of Transfer Credit Accepted

Only courses with grades of A or B may be accepted for transfer credit. With approval of the student's advisor, the Doctoral Program Director and the Doctoral Program Committee, a maximum of six hours of transfer credit for post-Master's coursework earned at a regionally or nationally accredited university within the previous five years will be accepted. The date for the first of these courses will become the starting date for the 8-year period for completing the PhD degree.

College of Health and Human Services Seminars

Doctoral students are expected to attend seminars sponsored by the College.

Advancement to Candidacy

The student takes the candidacy examination after the completion of at least 35 credits in the core curriculum (15 credits of interdisciplinary theoretical courses, and 20 credits of methods and methodological issues courses, which include all but the last two seminars in the curriculum area).

This is typically at the end of the 2nd year for full time students. The candidacy examination consists of the preparation and oral defense of three substantive papers, each focusing on a competency area of health services research, and will demonstrate the student's mastery of his or her individual research area. The purpose of the candidacy examination is twofold: (1) to ensure that the student can write and articulate a grant proposal prior to entering into the development of a dissertation proposal; and (2) to support the student's dissertation research. For full time students, the candidacy exam will take place within three years of beginning the PhD program. After passing the candidacy examination, a dissertation topic will then be proposed to the student's Dissertation Committee. A student advances to candidacy following approval of the dissertation topic by the student's Dissertation Committee and the Dean of the Graduate School.

Students will select a committee of 4 faculty (and the Graduate School will assign a 5th) who will continue to serve as the student's committee for the dissertation proposal and dissertation defense. The three substantive papers are as follows:

- Review of the literature of research area including relevant theories relating the research area to the goals of health services research
- Methodological paper
- Ethical and policy considerations of conducting health services research in the student's topical area

The papers must follow a format that is publishable. They must also each be 12-15 pages in length and follow APA format.

Oral Defense

Following submission of the candidacy exam to the committee two weeks before the scheduled defense date, the student will defend the exam orally. The student should prepare to introduce his or her area of research and its relationship to the papers. While the oral examination will emphasize questions relevant to the papers, questions on material from course work completed by the student may be asked.

Retake of the Candidacy Examination

A student who fails to complete the Candidacy Examination successfully may be given the opportunity to revise components and repeat the oral defense of the proposal at the discretion of the Dissertation Committee. A second failure of the Candidacy Examination results in dismissal from the PhD program.

Dissertation Proposal

The student will write the dissertation proposal using the grant format for the R03 from NIH. If the topic is related to the research of the Chair of the Dissertation Committee, the topic must represent a new line of investigation not being explored by the chair. In writing the grant dissertation proposal, the student will follow the National Institutes of

Health Research Grant (PHS 398) Guidelines (<http://grants1.nih.gov/grants/forms.htm>) except that the following are NOT required:

- The student will not be required to provide information on NIH forms.
- The proposal will not include preliminary data, biographical sketches, letters of collaboration, or budgets.

The proposal will include the following standard NIH sections:

- a) Specific Aims
- b) Background and Significance
- c) Research Design and Methods
- d) Human Subjects
- e) Literature Cited

Oral Defense of Proposal

Following submission of the full proposal to the student's Dissertation Committee, the student will be expected to defend the proposal orally. The oral defense will usually occur 2 weeks following full proposal submission. The student should prepare a PowerPoint presentation approximately 20 minutes in length summarizing the research proposal. This oral defense will be specific to the research significance, design, analysis, and human subjects issues of the proposal.

HSRD 8801: Dissertation Research (18 Credits)

Completion of the dissertation is the final component of the doctoral degree. A doctoral dissertation must demonstrate the candidate's ability to conceive, design, conduct, and interpret independent, original, and creative research, and must make a unique contribution to knowledge in the field of health services research. Under the direct supervision of the Dissertation Committee Chairs, students are encouraged to consult regularly with their Dissertation Committee members during the planning, conducting, and writing of the dissertation. The dissertation defense is a public defense. Notice of the location and time will go to the campus community.

Following the approval of the dissertation topic and advancement to doctoral candidacy, students are required to maintain continuous enrollment in HSRD 8801 for dissertation study until work is completed. Continuous enrollment begins in the semester after the dissertation topic is approved.

Evaluation

A student must maintain a cumulative average of 3.0 in all course work taken in the program. The seminars will be graded on a Pass/Unsatisfactory basis and therefore will not be included in the cumulative average. An accumulation of two C grades will result in termination of the student's enrollment in the doctoral program. Students will be allowed to repeat the Candidacy Exam, proposal defense, dissertation defense only once. A second failure of the candidacy examination, the dissertation proposal defense, or the final dissertation defense will result in dismissal from the

program. If a student makes a grade of U or NC on any course, enrollment will be terminated. A doctoral student whose enrollment has been terminated due to inadequate grades is ineligible to register in any semester or summer session. Please also see the section of the *Graduate Catalog* on Academic Regulations.

UNC Charlotte Residency Requirement

The student must satisfy the UNC Charlotte residency requirement for the program by completing 21 credit hours. Residence is considered to be continuous if the student is enrolled in one or more courses in successive semesters until 21 hours are earned.

Time Limits for Completion

All requirements for the degree must be completed within 8 years after the first registration as a doctoral student or the registration for any course transferred into the program toward degree requirements. The student must receive admission to candidacy within 6 years after admission to the program and complete all requirements within 6 years of admission to candidacy for the Ph.D. degree. These time limits are maximums; students will be typically expected to complete the degree requirements within 5 years.

COURSE DESCRIPTIONS

HSRD 8000. Topics in Health Services Research. (1-4) Prerequisites: Full graduate standing in the Ph.D. in Health Services Research program or permission of the instructor. Study of selected topics in health services research. May be repeated for credit. (Offered on a Pass/No Credit basis only). (*On demand*)

HSRD 8001. Introduction to Health Services Research. (3) Introductory course in models, theoretical frameworks and key components of health services research. Historical development of health services research will be traced. An in-depth study of social determinants of health will be explored. (*Fall*)

HSRD 8002. Health Care Systems and Delivery. (3) Doctoral seminar to provide a theoretical and empirical basis for understanding major organizational, delivery, and financing structures and related health outcomes comprising present day health care in the United States and globally. Evidence from health services research studies will be discussed as part of the identification of key areas for future research. Open only to students admitted to the PhD in Health Services Research or permission of the instructor. (*Fall*)

HSRD 8003/PPOL 8665. Analytic Epidemiology. (3) Crosslisted as HLTH 6260. Pre- or corequisites: a graduate introductory course in Epidemiology such as HLTH 6202, Community Epidemiology, or HADM 6104, Health and Disease. Principles and methods of studying advanced epidemiology, with emphasis on the analytic approach.

Includes: advanced techniques in the establishment of disease causation in groups and communities. Such topics a risk assessment, environmental exposures, stratification and adjustment, and multivariate analysis in epidemiology are covered. Emphasis is also placed on quality assurance and control and communicating results of epidemiological studies in professional publications and settings. (*Alternate Fall*)

HSRD 8004/PPOL 8667. Economics of Health and Health Care. (3) This course will use economic theory and econometrics to analyze the functioning of the health care sector and appropriate public policy. Topics will include: how markets for medical care differ from other markets, the demand for medical care, the demand and supply of health insurance, the role of competition in medical markets, managed care, managed competition, and the role of the public sector in regulating and financing health care. The topic list is flexible and student input will be solicited and welcomed. (*Alternate Fall*)

HSRD 8101. Design of Health Services Research. (3) Prerequisite: Master's level Applied Biostatistics course or equivalent. This course will provide an overview of quantitative and qualitative methods as applied to design and analysis of health services research problems. Qualitative topics: overview of philosophies of qualitative inquiry, characteristics of qualitative research design, managing qualitative data, and qualitative methods. Quantitative topics: categories and levels of quantitative research, characteristics of a good research design, relationship between theory and research, selection process for measurement tools, power analysis, sampling techniques, design sensitivity, and human subject protection. Open only to students admitted to the PhD program in Health Services Research or permission of instructor. (*Spring*)

HSRD 8102. Advanced Design of Health Services Research. (3) Prerequisites: STAT 8110/HSRD 8110, Applied Biostatistics: Regression, and HSRD 8101, Design of Health Services Research. This course will provide an overview of advanced quantitative methods as applied to design and analysis of health services research problems. Topics include: cost-effectiveness analysis, missing data, endogenous variables, panel data methods, and duration analysis. Other current topics in the design and analysis of health services research will also be considered. Open only to students admitted to PhD Health Services Research program or permission of the instructor. (*Fall*)

HSRD 8103. Large Data Sets and Health Services Research. (3) Prerequisite: STAT 8111/HSRD 8111, Applied Biostatistics: Multivariate Methods, and HSRD 8102, Advanced Design of Health Services Research. Health quality and outcomes issues addressed through secondary data analysis using large, public data sets will be examined. Issues related to secondary analysis and drawing items from multiple data sets will be discussed. Analytical techniques such as adjustments for missing data, transformations of data, and risk adjustment will be applied

using public data sets. Open only to students admitted to PhD Health Services Research program or permission of the instructor. (*Spring*)

HSRD 8104. Healthcare Program Evaluation, Outcomes, and Quality. (3) Prerequisite: HSRD 8102, Advanced Design of Health Services Research or permission of the instructor. Introductory course in evaluation research in health care settings. Emphasis is on conceptual, methodological, organizational, political, and ethical problems in evaluating programs. Tasks of identifying quality and outcome indicators, choosing methods, assessing feasibility, assuring quality data, addressing population and program diversity, project management, and incorporating context into reports of findings are also examined. (*Alternate Spring*)

HSRD 8800. Independent Study in Health Services Research. (1-6) Prerequisite: Full graduate standing in the Ph.D. in Health Services Research program or permission of the instructor. Offered on a Pass/Unsatisfactory basis only. (*On demand*)

HSRD 8801. Dissertation Research. (1-9) Prerequisite: Passage of comprehensive examination and approval of dissertation topic by student's advisory committee. Investigation of a topic in health services research which makes a substantial addition to the field. Maximum of 18 hours allowed under this course designation. Offered on a Pass/Unsatisfactory basis only. (*Fall, Spring, Summer*)

HSRD 8881. Seminar in Research Ethics. (1) Examination of ethical issues related to human subjects research with an emphasis on health services research including review of prominent scientific misconduct cases; federal and local (IRB) regulations, processes and procedures; and possible ethical issues with specific types of research (clinical trials, international research, research with existing data, collaborative research). Open only to student admitted to the Health Services Research Ph.D. Program. Offered on a Pass/Unsatisfactory basis only. (*Alternate Spring*)

HSRD 8882. Seminar in Health Disparities. (1) Prerequisites: HSRD 8001, Introduction to Health Services Research. Open only to admitted students in the Health Services Research PhD Program. A review of current research documenting disparities and an examination of research design and methods sensitive to cultural issues in health services research. Study will include work from a variety of health services research disciplinary perspectives. Offered on a Pass/Unsatisfactory basis only. (*Alternate Fall*)

HSRD 8883. Seminar in Grant Proposal Writing. (1) Pre or Corequisites: HSRD 8103, Large Data Sets and Health Services Research. Permission of dissertation advisor. Seminar to develop a dissertation grant proposal using existing dissertation funding mechanisms from government agencies and foundations. This course uses a step-wise approach to writing all major sections of a grant proposal. Proposal examples will be presented. Open only to

admitted students Health Services Research PhD Program. Offered on a Pass/Unsatisfactory basis only. (*Alternate Spring*)

HSRD 8884. Seminar in Research Implementation and Dissemination. (1) Pre or Corequisites: Passed comprehensive examination. Seminar on implementation of a funded research project. The infrastructure for successful implementation and reporting will be discussed with specific examples. Pitfalls in technology, communication, natural history of a study and budgeting will be discussed. Case studies based on studies by faculty will be used to illustrate the range of approaches to the research process. Students will develop an application to present and a manuscript for publication. Open only to admitted students Health Services Research PhD Program. Offered on a Pass/Unsatisfactory basis only. (*Alternate Fall*)

HSRD 9999. Doctoral Degree Graduate Residency Credit. Prerequisite: Completed enrollment in the maximum 18 hours of HSRD 8801 Dissertation Research. This course is to allow a student who has taken all permissible credits toward dissertation research to finish work on the dissertation. This course does not count toward the 64 credits for the degree. Offered on a Pass/Unsatisfactory basis only.

PPOL 8663/HSRD 8005. Health Policy. (3) Prerequisites: Full graduate standing in the Ph.D. in Public Policy or Health Services Research programs and a graduate level course providing an adequate introduction to the U.S. health care system such as HADM 6112, MPAD 6172, or permission of the Instructor. This course examines the formulation, adoption, implementation, and evaluation of health policy at national, state, and local levels through extensive readings in relevant health and policy literatures. (*Alternate Spring*)

STAT 8110/HSRD 8110. Applied Biostatistics: Regression. (3) Prerequisites: Graduate level Introduction to Biostatistics or approved Statistics course; basic knowledge of statistical software; or permission of the instructor. To understand and apply concepts and principles of regression based statistical methods (regression, linear models, logistic regression, Poisson regression) to health related studies. Selection of appropriate methods for analysis, development of skills to conduct the analysis of the data and capability to write in scientific language the results of the study will be studied. (*Spring*)

STAT 8111/HSRD 8111. Applied Biostatistics: Multivariate Methods. (3) Prerequisites: STAT 8110/HSRD 8110, Applied Biostatistics: Regression; or permission of the instructor. Includes study of the concepts, principles and statistical methods of analysis of discrete and continuous multivariate data. Students will learn to use the most popular methods of multivariate data reduction, classification and clustering such as principal components, factor analysis and canonical correlation analysis. Design issues, verification of the assumptions and interpretation of

the results will be discussed. Skills for concise presentation of the results of statistical analysis will be developed. (*Fall*)

Nursing

- Master of Science In Nursing (MSN)
- Graduate Certificates
- Post-Master's Certificates

School of Nursing

449 College of Health and Human Services
704-687-7952
<http://nursing.uncc.edu>

Directors

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Gwendolyn F. Foss, Associate Director, Graduate Division
Lienne D. Edwards, Associate Director, Undergraduate Division

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Judith Cornelius, PhD, Assistant Professor
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Jackie Dienemann, PhD, Professor
Lienne Edwards, EdD, Associate Professor
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Donna Kazemi, PhD, Assistant Professor
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Sharon MacKinnon, MSN, Lecturer
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Tama Morris, PhD, Assistant Professor
Jane Neese, PhD, Associate Professor
Mary Nies, PhD, Professor
Ann Newman, PhD, Associate Professor
Pattie Shoe, MSN, Lecturer
Laura Talbot, PhD, Professor
Lucille Travis, PhD, Professor
Margaret Wilmoth, PhD, Professor

MASTER OF SCIENCE IN NURSING (MSN)

The Commission on Collegiate Nursing Education (CCNE) accredited Master of Science in Nursing degree is

designed to prepare nurses for advanced practice in Nurse Anesthesia, Clinical Practice, or Systems/Populations Practice. Specialty concentrations in Advanced Clinical Practice include Family Nurse Practitioner; Adult Nurse Practitioner; and Psychiatric Mental Health Nursing. Specialty concentrations in Systems/Population include Community/Public Health Nursing; Nurse Administrator (MSN); and Nurse Educator. Two graduate certificates are available: Nurse Administrator-and Nurse Educator. Three post-masters certificates are available: Family Nurse Practitioner, Adult Nurse Practitioner, and Nurse Anesthesia. Offerings of specific concentrations are dependent on sufficient enrollment. Each concentration is individually described.

Program Accreditation

The MSN Program is accredited by CCNE. Graduates of the program will be eligible to take the American Nurses Credentialing Center (ANCC) advanced examination for relevant specialties and/or other professional certification exams.

Majors

- Nurse Anesthesia Major
- Advanced Clinical Major
 - Adult Nurse Practitioner (*currently not accepting applications*)
 - Family Nurse Practitioner
 - Psychiatric Mental Health Nursing (*offered on demand*)
- Systems/Population Major
 - Health Administration Dual Degree (*currently not accepting applications*)
 - Nurse Administrator
 - Community/Public Health Nursing
 - Nurse Educator

Additional Admission and Progression Requirements for the MSN degree

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Nursing*:

- 1) Current unrestricted licensure as a Registered Nurse. Current license in North Carolina or a compact state or the state identified by faculty for clinical practice before enrollment.
- 2) Baccalaureate degree from an accredited university. If the degree is not in Nursing and courses in Research, Leadership/Management, Aging and Health and Community Health are lacking, they will be required as part of the program of study.
- 3) Satisfactory performance on the Graduate Record Examination or the Miller Analogies Test or a previous Graduate degree with documentation of test scores.

- 4) One year of professional nursing practice is recommended.
- 5) An essay (statement of purpose) describing the applicant's experience and objective in undertaking graduate study in the chosen specialty.
- 6) Overall GPA of at least 3.0 in the last degree earned is preferred.
- 7) Completion of a statistics course with a grade of C or better.
- 8) See specialty track admission requirements for application dates that vary from those published by the Graduate School.

**See additional admission requirements for specific major*

Degree Requirements

The MSN specialty concentrations require completion of 36 to 63 graduate credit hours depending on the specialty. All concentrations require a Synthesis project or Thesis. Specific requirements and prerequisites for each concentration are listed below. Most concentrations are designed to accommodate full-time and part-time students, and many classes are held in the late afternoon or evening.

Up to a total of six graduate semester credit hours may be accepted from another accredited institution or from a post-baccalaureate program at UNC Charlotte. All courses must be approved prior to transfer by the student's advisor, the Associate Director of the Graduate Division, and the Dean of the Graduate School. All course work, including accepted transfer credits, must be completed within a six-year period.

Assistantships

A limited number of graduate assistantships are available. Information about them is available in the School of Nursing, and from the Associate Dean for Academic Affairs, College of Health and Human Services.

Additional Financial Aid

Scholarships from the North Carolina Nurse Scholars Program – Master's Program (M-NSP) are available to part-time or full-time students admitted to the nursing program for up to two years of study. The M-NSP scholarships are competitive and preference will be given to full-time students. Awards are not based on financial need. The application deadline is early May. Further information and application forms are available on the School of Nursing webpage for Student Resources or in the Office of Student Services in the College of Health and Human Services.

A limited number of Professional Nurse Traineeships are available to full-time students. The traineeship awards fund a portion of in-state tuition/fees. Further information and application forms are available from the School of Nursing. Students in the second or third year of the nurse anesthesia major are eligible for Nurse Anesthesia Traineeships.

Early Entry Program for the Master of Science in Nursing

The RN-MSN program is designed for the outstanding student who wants to pursue an accelerated path to the MSN. Applicants must meet all admission requirements for the RN to BSN as well as the selected graduate program. A student makes application directly to the Graduate School with the appropriate fee simultaneously with the application to RN-BSN. Tuition rates for courses are based on the academic status of students, not on the undergraduate or graduate level of the course. As soon as students enroll in the graduate program, their academic status becomes graduate level. This changes the tuition charges from undergraduate to graduate for all courses taken in the RN to BSN program as well as the courses in the MSN program.

The following additional application criteria apply to Early Entry MSN applicants:

- 1) Meets all criteria for admission to the RN-BSN Program (all prerequisites taken).
- 2) Satisfactory performance on the Graduate Record Examination or the Miller Analogies Test or a previous Graduate degree with documentation of test scores.
- 3) One year of professional nursing practice is recommended.
- 4) An essay (statement of purpose) describing the applicant's experience and objective in undertaking graduate study in the chosen specialty.
- 5) The program of study will substitute ten credits from the MSN for the BSN program. NURS 6160 Nursing Research will be substituted for NURN 4900 Research in Nursing Practice; NURS 6115 Health Policy will be substituted for NURN 4201 Information Technology: Applications in Health Care, NURS 6101 Theoretical Basis for Nursing Practice will be substituted for NURN 3103 Concepts of Professional Science; and one additional graduate course will be substituted for the Nursing Elective. Credit hours for NURS 3103 are awarded upon successful completion of NURN 4450. These ten credits will apply to both programs.
- 6) Progression in the MSN program is provisional upon evidence of successful completion of the BSN with a GPA of 3.0 in the RN-BSN program.
- 7) Students graduate with a BSN and then a MSN
- 8) The Nurse Anesthesia Specialty does not admit Early Entry students.

Nurse Anesthesia

MASTER OF SCIENCE IN NURSING (MSN): NURSE ANESTHESIA

The specialty concentration in Nurse Anesthesia is offered in conjunction with the Carolinas Medical Center and is accredited by the Council on Accreditation of Nurse Anesthesia Education Programs. It provides both the theory and clinical practice required to qualify to take the national certifying examination upon graduation. In addition to

MSN core courses, students complete cognate and clinical courses in nurse anesthesia as well as clinical experiences at Carolinas HealthCare System and other affiliated sites.

Additional Admission Requirements

In addition to the requirements of the Graduate School and College, applicants to the Nurse Anesthesia program must have:

- 1) Baccalaureate degree in nursing (BSN) from an accredited nursing program.
- 2) A grade point average (GPA) of 3.0 on a 4.0 scale for all undergraduate work after high school
- 3) A grade point average of 3.0 on a 4.0 scale for all basic undergraduate science courses (Chemistry, Biology, Anatomy and Physiology, Pathophysiology, and Microbiology).
- 4) Satisfactory performance on the Graduate Record Exam (GRE); a score of 950 is preferred (MAT scores are not accepted).
- 5) A minimum of 18 months of current full time critical care experience with adult clients prior to matriculation.
 - a) Acceptable experience includes: Intensive Care Unit, Coronary Care Unit, Trauma Intensive Care Unit, Neuro Intensive Care Unit, Surgical Intensive Care Unit, Cardio-vascular Intensive Care Unit.
 - b) Experiences not acceptable include: Flight Team, Emergency Room, Pediatric Intensive Care Unit, Neonatal Intensive Care Unit, and Post Anesthesia Care Unit.
- 6) Current certification in Basic Cardiac Life Support, Advanced Cardiac Life Support, and Pediatric Life Support with documentation provided only to Carolinas HealthCare System Nurse Anesthesia Program.
- 7) Statement of Purpose in application packet limited to a single page.
- 8) Applicants who meet the admission requirements will be eligible to be invited for an interview with the Admissions Committee, which are held in October/November, January, and April. The application process requires two applications – one to UNC Charlotte and one to Carolinas HealthCare System. Only after a successful interview, will the applicant be admitted.

Degree Requirements

The program requires completion of 63 semester hours in approved courses including:

Core Courses (15 hours)

- NURS 6101 Theoretical Basis for Nursing Practice (3)
- NURS 6115 Health Policy and Planning in the U.S. (3)
- NURS 6160 Research in Nursing and the Health Professions (3)
- STAT 6127 Introduction to Biostatistics (3)
- BIOL 6273 Advanced Human Physiology (3)

Specialty Courses (48 hours)

- NUAN 6151 Principles of Nurse Anesthesia I (3)
- NUAN 6152 Principles of Nurse Anesthesia II (3)
- NUAN 6153 Principles of Nurse Anesthesia III (3)
- NUAN 6154 Pharmacology of Non Anesthetic Agents (4)
- NUAN 6155 Pharmacology of Anesthetic Agents (4)
- NUAN 6156 Applied Physics and Chemistry in Nurse Anesthesia (3)
- NUAN 6157 Applied Pathophysiology in Nurse Anesthesia I (3)
- NUAN 6158 Applied Pathophysiology in Nurse Anesthesia II (3)
- NUAN 6171 Professional Aspects of Nurse Anesthesia I (1)
- NUAN 6172 Professional Aspects of Nurse Anesthesia II (1)
- NUAN 6485 Clinical Residency in Nurse Anesthesia I (5)
- NUAN 6486 Clinical Residency in Nurse Anesthesia II (5)
- NUAN 6487 Clinical Residency in Nurse Anesthesia III (5)
- NUAN 6489 Clinical Residency in Nurse Anesthesia IV (5)

POST-MASTER'S CERTIFICATE IN NURSE ANESTHESIA

The post-master's certificate (48 graduate credit hours) will be awarded to students who have completed a Master of Science in Nursing (MSN) from an accredited program and wish to function as a Certified Registered Nurse Anesthetist (CRNA). The full-time course of study plan allow for certificate completion within 27 months of full time study or 39 months of part time study. Courses must be taken in the order outlined in the master's curriculum. In addition the student must complete all requirements outlined by the Council on Certification of Nurse Anesthetists (CCNA).

Additional Admission Requirements

In addition to the requirements of the Graduate School and College, applicants to the Nurse Anesthesia program must have:

- 1) Current unrestricted licensure as a Registered Nurse. Current license in North Carolina or a compact state or the state identified by faculty for clinical practice before enrollment.
- 2) Master's degree in Nursing from an accredited program
- 3) Application to CMC accompanied by current fee
- 4) 18 months current critical care experience with adults
- 5) Certification in Advanced Cardiac Life Support (ACLS), Basic Cardiac Life Support (BCLS), Pediatric Advanced Life Support (PALS)
- 6) An essay (statement of purpose) in application package describing the applicant's experience and objective in undertaking certificate study

- 7) In-person interview. Interviews are conducted three times per year, in October/November, January, and April. All application materials must be submitted to the Graduate School and the Nurse Anesthesia program no later than eight weeks prior to the interviews.
- 8) Applicants who meet the admission requirements will be eligible to be invited for an interview with the Admissions Committee. Only after a successful interview will the applicant be admitted.

Certificate Requirements

Specialty Courses (48 hours)

- NUAN 6151 Principles of Anesthesia I (3)
- NUAN 6152 Principles of Anesthesia II (3)
- NUAN 6153 Principles of Anesthesia III (3)
- NUAN 6154 Pharmacology of Non Anesthetic Agents (4)
- NUAN 6155 Pharmacology of Anesthetic Agents (4)
- NUAN 6156 Applied Physics & Chemistry in Nurse Anesthesia (3)
- NUAN 6157 Applied Pathophysiology in Nurse Anesthesia I (3)
- NUAN 6158 Applied Pathophysiology in Nurse Anesthesia II (3)
- NUAN 6171 Professional Aspects of Nurse Anesthesia I (1)
- NUAN 6172 Professional Aspects of Nurse Anesthesia II (1)
- NUAN 6485 Clinical Residency in Nurse Anesthesia I (5)
- NUAN 6486 Clinical Residency in Nurse Anesthesia II (5)
- NUAN 6487 Clinical Residency in Nurse Anesthesia III (5)
- NUAN 6489 Clinical Residency in Nurse Anesthesia IV (5)

Application Process

The application process requires two applications – one to UNC Charlotte and one to Carolinas HealthCare System.

- 1) The UNC Charlotte application is completed online and information can be obtained from:

Graduate Admissions
UNC Charlotte
210 Cato Hall
9201 University City Blvd.
Charlotte, NC 28223-0001
704.687.5503 (phone)
704.687.7254 (fax)
www.uncc.edu/gradmiss

- 2) The Carolinas Medical Center application forms and materials can be obtained from:

Carolinas Medical Center
Nurse Anesthesia Program
P.O. Box 32861
Charlotte, NC 28232-2861

704.355.2375 (Phone)

704.355.7263 (Fax)

www.carolinasmedicalcenter.org/body.cfm?id=1662

Applicants who meet academic admission requirements will be eligible to be invited for an interview with the Admission Committee. Interviews are conducted in Late October/November, January, and April. The application process requires two applications – one to UNC Charlotte and one to Carolinas Medical Center to be submitted no later than six weeks prior to the interviews.

Advanced Clinical Specialties

ADULT NURSE PRACTITIONER (ANP)

(currently not accepting applications)

These advanced practice registered nurses will be prepared to function as Adult Nurse Practitioners (ANP). Adult Nurse Practitioners provide primary care and specialty care to Adolescents, Adults and Elders. Graduates with this option will be eligible to take the American Nurses Credentialing Center (ANCC) or American Academy of Nurse Practitioner (AANP) examination for Adult Nurse Practitioners.

Additional Admission Requirements

- 1) Unencumbered license as a Registered Nurse in North Carolina.
- 2) BSN degree from nationally accredited program is preferred. If the baccalaureate is not in nursing, the following courses from the RN to BSN program (or their equivalent) are required:
 - NURN 4100 Aging and Health
 - NURN 3108 Health Assessment for Nurses (with Lab)
 - NURN 4203 Leadership in Nursing Practice
 - NURN 4440 Community Health Nursing
 - NURN 4900 Research in Nursing Practice
- 3) Total score of 950 on verbal and quantitative portions of Graduate Record Exam (GRE) or a score of 400 on the Miller Analogy Test is preferred. Applicants with scores less than those designated may be considered based on the total application profile.
- 4) One year of professional nursing practice following completion of an RN program.
- 5) Overall GPA of 3.0 on a 4.0 scale in the last 60 hours of coursework.
- 6) Statement of purpose in application packet should explain the applicant's career goal in primary care.
- 7) References should be from professional colleagues and should speak to clinical knowledge and expertise and one's ability to function a member of the health care team. At least one reference from a supervisory person is preferred.

Students are admitted annually in the fall with applications due to the Graduate School by February 15.

Degree Requirements

The program requires completion of 44 semester credit hours in approved courses including:

Core Courses (9 hours)

- NURS 6101 Theoretical Basis for Nursing Practice (3)
- NURS 6160 Research in Nursing (3)
- NURS 6115 Health Policy and Planning in the U.S. (3)

Cognate Courses (6 hours)

- STAT 6127 Introduction to Biostatistics (3)
- BIOL 6274 Pathophysiology (3)

Advanced Clinical Core (7 hours)

- NURS 6220 Pharmacotherapeutics in Advanced Nursing Practice (3)
- NURS 6230 Health Assessment and Diagnostic Reasoning for Advanced Practice (3)
- NURS 6430 Health Assessment and Diagnostic Reasoning for Advanced Practice Practicum (1)*

ANP Specialty Courses (19 hours)

- NUNP 6250 Advanced Primary Care and Health Promotion of Adults (3)
- NUNP 6401 Advanced Practice Nursing in Ambulatory Care Practicum (4)*
- NUNP 6240 Advanced Primary Care Reproductive Health (3)
- NUNP 6202 Complex Health Care Management of Adults (3)
- NUNP 6402 Advanced Practice Nursing in Complex Care Practicum (4)*
- NUNP 6403 Advanced Practice Nursing in Specialty Care of Adults Practicum (2)*

Synthesis Project or Thesis (3 hours)

- NURS 6601 Synthesis and Integration in Advanced Nursing Practice I (1)
- NURS 6602 Synthesis and Integration in Advanced Nursing Practice II (2)
- OR NURS 6962 Thesis (3)

**Clinical Course that requires 60 hours practice for each 1 credit hours*

Additional Degree Requirements

- 1) A minimum of 600 hours of supervised clinical experience as a Nurse Practitioner student is required.
- 2) Students may receive no more than one C grade in any graduate course. The second C will result in suspension from the program.
- 3) In order to progress in the specialty, a grade of B is required in the following courses:
 - a) BIOL 6274 Pathophysiology
 - b) NURS 6220 Pharmacotherapeutics in Advanced Nursing Practice (3)
 - c) NURS 6230 Health Assessment and Diagnostic Reasoning for Advanced Practice (3)

- d) NURS 6430 Health Assessment and Diagnostic Reasoning for Advanced Practice Practicum (1)*
 - e) All required courses with a NUNP prefix.
- 4) Faculty advising is required.

Research Opportunities

Students who choose to do so will have the opportunity to serve as Research Assistants on faculty research projects. Students will have an opportunity to choose a mentored research experience in their Synthesis courses.

POST-MASTER'S CERTIFICATE IN ADULT NURSE PRACTITIONER (ANP) *(currently not accepting applications)*

The post Master's certificate consists of specialty courses in advanced practice nursing (18 graduate credit hours). This certificate program will prepare nurses holding master's degrees in nursing to enter advanced practice nursing as an adult nurse practitioner. Nurses already certified as Psych NPs, Women's Health or Pediatric NPs will be evaluated for possible exclusion of respective specialty courses and practica from their program. The recipients of this certificate will be eligible to take the American Nurses Credentialing Center (ANCC) or American Academy of Nurse Practitioners (AANP) examination for Adult Nurse Practitioners. Course work must be completed within four years and a 3.0 (B) grade point average is required.

Admission Requirements:

- 1) A master's degree in nursing from a nationally accredited nursing program
- 2) Written application to graduate admissions
- 3) Unencumbered North Carolina License as a Registered Nurse
- 4) Official transcripts from a Master's degree
- 5) Graduate Health Assessment course equivalent within the last 3 years
- 6) Graduate Pharmacology course equivalent within the last 3 years
- 7) Graduate Pathophysiology within the last 3 years**

***Nurses certified as Women's Health nurse practitioners, Psych NPs, or Pediatric nurse practitioners may have these courses waived from the admission requirements after assessment of transcripts.*

Certificate Requirements:

- NUNP 6250 Advanced Primary Care and Health Promotion of Adults (3)
- NUNP 6401 Advanced Practice Nursing in Ambulatory Care Practicum (4)****
- NUNP 6240 Advanced Primary Care Reproductive Health (3)***
- NUNP 6202 Complex Health Care management of Adults (3)

NUNP 6402 Advanced Practice Nursing in Complex Care Practicum (4)****

NUNP 6403 Advanced Practice Nursing in Specialty Care of Adults Practicum (2)****

Note: Nurses with other backgrounds will be evaluated on an individual basis

***Nurses certified as Women's Health nurse practitioners will not be required to take this course.

****Clinical Course that requires 60 hours practice for each 1 credit hour

Students are admitted annually in the fall with applications due to the Graduate School by February 15.

FAMILY NURSE PRACTITIONER (FNP)

This program leads to a MSN with a concentration in Family Health Nursing. These advanced practice registered nurses (APRN) will be prepared to function as Family Nurse Practitioners providing primary care to families across the lifespan. The graduates of this program will be eligible to take the American Nurses Credentialing Center (ANCC) or American Academy of Nurse Practitioners (AANP) examination for Family Nurse Practitioners.

Additional Admission Requirements

- 1) Unencumbered license as a Registered Nurse in North Carolina
- 2) BSN degree from nationally accredited program is preferred. If the baccalaureate is not in nursing, the following courses from the RN to BSN program (or their equivalent) are required:
 - a) NURN 4100 Aging and Health
 - b) NURN 3108 Health Assessment for Nurses with Lab
 - c) NURN 4203 Leadership in Nursing Practice
 - d) NURN 4440 Community Health Nursing
 - e) NURN 4900 Research in Nursing Practice
- 3) Total score of 950 on verbal and quantitative portions of Graduate Record Exam (GRE) or a score of 400 on the Miller Analogy Test is preferred. Applicants with scores less than those designated may be considered based on the total application profile.
- 4) One year of professional nursing practice following completion of an RN program.
- 5) Overall GPA of 3.0 on a 4.0 scale in the last 60 hours of coursework.
- 6) Statement of purpose in application packet should explain the applicant's career goal in relation to primary care and family practice.
- 7) References should be from professional colleagues and should speak to clinical knowledge and expertise and one's ability to function a member of the health care team. At least one reference from a supervisory person is preferred.

Students are admitted annually in the fall with applications due to the Graduate School by February 15.

Degree Requirements

The program requires completion of 46 semester credit hours in approved courses.

Core Courses (9 hours)

- NURS 6101 Theoretical Basis for Nursing Practice (3)
- NURS 6160 Research in Nursing (3)
- NURS 6115 Health Policy and Planning in the U.S. (3)

Cognate Courses (6 hours)

- STAT 6127 Introduction to Biostatistics (3)
- BIOL 6274 Pathophysiology (3)

Advanced Clinical Core (7 hours)

- NURS 6220 Pharmacotherapeutics in Advanced Nursing Practice (3)
- NURS 6230 Health Assessment and Diagnostic Reasoning for Advanced Practice (3)
- NURS 6430 Health Assessment and Diagnostic Reasoning for Advanced Practice Practicum (1)*

FNP Specialty Courses (21 hours)

- NURS 6210 Family Health In Advanced Practice Nursing (2)
- NUNP 6250 Advanced Primary Care and Health Promotion of Adults (3)
- NUNP 6450 Advanced Primary Care and Health Promotion of Adults Practicum (2)*
- NUNP 6240 Advanced Primary Care Reproductive Health (3)
- NUNP 6440 Advanced Primary Care Reproductive Health Practicum (2)*
- NUNP 6260 Advanced Primary Care of Children and Adolescents (3)
- NUNP 6460 Advanced Primary Care of Children and Adolescents Practicum (2)*
- NUNP 6400 Internship in Family Health Nursing (4)*

Synthesis Project or Thesis (3 hours)

- NURS 6601 Synthesis and Integration in Advanced Nursing Practice I (1)
- NURS 6602 Synthesis and Integration in Advanced Nursing Practice II (2)
- OR NURS 6962 Thesis (3)

Additional Degree Requirements

- 5) A minimum of 600 hours of supervised clinical experience as a Nurse Practitioner is required.
- 6) Students may receive no more than one C grade in any graduate course. The second C will result in suspension from the program.
- 7) In order to progress in the specialty, a grade of B is required in the following courses:
 - a) BIOL 6274 Pathophysiology
 - b) NURS 6220 Pharmacotherapeutics in Advanced Nursing Practice (3)

- c) NURS 6230 Health Assessment and Diagnostic Reasoning for Advanced Practice (3)
 - d) NURS 6430 Health Assessment and Diagnostic Reasoning for Advanced Practice Practicum (1)*
 - e) All required courses with a NUNP prefix.
- 8) Faculty advising is required.

Research Opportunities

Students who choose to do so will have the opportunity to serve as Research Assistants on faculty research projects. Students will have an opportunity to choose a mentored research experience in their Synthesis courses.

**Clinical Course that requires 60 hours practice for each 1 credit hours*

POST-MASTER'S CERTIFICATE IN FAMILY NURSE PRACTITIONER (FNP)

The 21 credit certificate consists of specialty courses in advanced practice nursing. This certificate program will prepare nurses holding master's degrees in nursing to enter advanced practice nursing as a family nurse practitioner. Nurses already certified as Psych NPs, Women's Health or Pediatric NPs will be evaluated for possible exclusion of respective specialty courses and practica from their program. The recipients of this certificate will be eligible to take the American Nurses Credentialing Center (ANCC) or the American Academy of Nurse Practitioner (AANP) examination for Family Nurse Practitioners. Coursework must be completed within four years and a 3.0 (B) grade point average is required.

Admission Requirements

- 1) A master's degree in nursing from a nationally accredited nursing program
- 2) Written application to graduate admissions
- 3) Unencumbered North Carolina License as a Registered Nurse
- 4) Official transcripts from the Master's degree.
- 5) Graduate Health Assessment course equivalent within the last 3 years**
- 6) Graduate Pharmacology course equivalent within the last 3 years**
- 7) Graduate Pathophysiology within the last 3 years**

***Nurses certified as adult nurse practitioners, women's health nurse practitioners, or pediatric nurse practitioners may have these courses waived from the admission requirements after assessment of transcripts.*

Certificate Requirements

- NURS 6210 Family Health in Advanced Practice Nursing (2)
- NUNP 6240 Adv Primary Care Reproductive Health Care (3)***

- NUNP 6440 Advanced Primary Care Reproductive Health Care Practicum (2)***
- NUNP 6250 Advanced Primary Care and Health Promotion of Adults (3)**
- NUNP 6450 Advanced Primary Care and Health Promotion of Adults Practicum (2)**
- NUNP 6260 Advanced Primary Care of Children and Adolescents (3)****
- NUNP 6460 Advanced Primary Care of Children and Adolescents Practicum (2)****
- NUNP 6400 Internship in Family Health Nursing (4)

***Nurses certified as Adult nurse practitioners will not be required to take these courses.*

****Nurses certified as Women's Health nurse practitioners will not be required to take these courses.*

*****Nurses certified as Pediatric nurse practitioners will not be required to take these courses*

NOTE: Nurses with other backgrounds will be evaluated on an individual basis

Students are admitted annually in the fall with applications due to the Graduate School by February 15.

MASTER OF SCIENCE IN NURSING (MSN): ADULT PSYCHIATRIC MENTAL HEALTH (concentration offered on demand)

The Adult Psychiatric Mental Health Clinical Nurse Specialist track focuses on the role of the advanced practice PMHN in the assessment and management of individuals, groups, and communities. Graduates of this program will be prepared to complete requirements for certification as a Clinical Specialist in Adult Psychiatric and Mental Health Nursing. during the school year.

Additional Admission Requirements

- 1) A Graduate Record Exam (GRE) (score of 500 on each of 2 of the 3 sections) or the Miller Analogy (MAT) (score of 400 or above) is required
- 2) Rolling admissions: applicants may apply any time
- 3) A GPA of at least 3.0 on the last 60 semester hours
- 4) Computer competency

Degree Requirements

This program requires 43 semester hours as follows:

Core Courses (15 hours)

- NURS 6101 Theoretical Basis for Nursing Practice (3)
- NURS 6115 Health Policy & Planning in the U.S. (3)
- NURS 6160 Research in Nursing and Health Professions (3)
- NURS 6210 Family Health in Advanced Practice Nursing (2)

Specialty Concentration (22 hours)

- NURS 6220 Pharmacotherapeutics for Advanced Nursing Practice (3)
 NURS 6230 Advanced Health Assessment and Diagnostic Reasoning (2)
 NURS 6430 Advanced Health Assessment Practicum (1)
 NUMH 6200 Psychiatric Mental Health Theories and Constructs of Mental Health Care (3)
 NUMH 6130 Advanced Psychiatric Mental Health Nursing Practice with Individuals (2)
 NUMH 6430 Practicum in Advanced Practice Psychiatric Mental Health Nursing with Individuals (2)
 NUMH 6135 Advanced Psychiatric Mental Health Nursing Practice with Groups and Communities (2)
 NUMH 6435 Practicum in Advanced Practice Psychiatric Mental Health Nursing with Groups and Communities (2)
 NUMH 6201 Seminars in Advanced Practice Psychiatric Mental Health Nursing (1)
 NUMH 6401 Internship in Advanced Psychiatric Mental Health Nursing Practice (4)

Cognate Courses (6 hours)

- STAT 6127 Introduction to Biostatistics (3)
 BIOL 6273 Advanced Human Physiology (3)

Additional Degree Requirements

- 1) A total of 540 hours of supervised clinical practice experience is required to complete the program
- 2) Faculty advising is required each semester

Systems/Populations Specialties

MASTER OF SCIENCE IN NURSING (MSN): NURSING ADMINISTRATION (distance education)

This concentration will prepare nurses for advanced practice in administrative roles such as Nurse Executive, Nurse Manager, Quality Improvement Manager, Ambulatory Care Manager or other system level nursing positions in community agencies, health care facilities, health departments and schools of nursing. Graduates will meet the educational requirements for the American Nurses Credentialing Center (ANCC) certification in Nursing Administration or Nursing Administration Advanced (CNAA).

Additional Admission Requirements

- 1) Score on GMAT may be considered in lieu of the GRE or MAT
- 2) Graduation from a post secondary level Nursing Program (United States RN Registration not required)
- 3) Access to computer within minimum requirements for online courses. Current minimum computer hardware specifications are listed by Distance Education.

Degree Requirements

This program requires completion of 36 semester credit hours in approved courses including:

Core Courses (9 Hours):

- NURS 6101 Theoretical Basis for Nursing Practice (3)
 NURS 6160 Research in Nursing (3)
 NURS 6115 Health Policy & Planning in the US (3)

System Core Courses (6 hours)

- NURS 6211 Health Disparities and Nursing (3)

OR

- NURS 6090 Selected Topics (Study Abroad)
 NURS 6212 Program Improvement & Evaluation (3)

Specialty Courses (18 hours)

- NURS 6185 Theory and Application in the Organizational Behavior to Nursing Systems (3)
 NURS 6187 Health Informatics & Financial Management for Nurses (3)
 NURS 6188 Strategic Planning & Decision Making in Nursing (3)
 NURS 6301 Curriculum Planning & Instruction (3)
 NURS 6485 Advanced Practicum in Nursing Administration and Leadership (3)
 NURS 6303 Instructional Technology in Nursing Education (3)

OR

- NURS 6302 Trends & Issues in Nursing Education (3)

Capstone Course (3 hours)

- NURS 6601 Synthesis in Advanced Nursing Practice I (3)
 NURS 6602 Synthesis in Advanced Nursing Practice II (3)
 OR
 NURS 6962 Thesis (3)

Additional Degree Requirements

- 1) Nursing Administration specialty courses are only offered online through Distance Education. Core and System/Population Core courses can be taken on campus or online as published in the Schedule of Courses.
- 2) Courses in the Nursing Administration specialty are offered every other year.
- 3) A total of 360 clinical hours is required to complete the program.
- 4) Students must maintain a minimum 3.0 ("B") GPA in their graduate courses, and may not accumulate more than two "C" grades
- 5) Faculty Advising is required.
- 6) Access to computer within minimum requirements for online courses. Current minimum computer hardware specifications are listed by Distance Education online at www.distanceed.uncc.edu.

GRADUATE CERTIFICATE IN NURSING ADMINISTRATION

(distance education)

The Certificate in Nursing Administration is designed for nurses who hold a bachelor's degree and desire to enhance their administrative skills and advanced practice nurses with master's degree who desire additional knowledge to be competitive in managing personnel or groups.

The Nursing Administration Certificate program of study consists of specialty courses in nursing administration and health administration (12 graduate credit hours). Students will complete three core courses and choose one three-credit-hour elective. The certificate can be completed in 1 year through part-time study.

Admission Requirements

- 1) Baccalaureate degree from an accredited college or university
- 2) Graduation from a post secondary level Nursing Program (United States RN Registration not required)
- 3) Two official transcripts of all academic work attempted beyond high school
- 4) An essay (statement of purpose) in application packet that includes a description of a selected area of specialization in nursing practice. It is expected that the student will develop a portfolio demonstration expertise in a specialization during this program of study.
- 5) Three letters of professional recommendation

Certificate Requirements

- NURS 6185 Theory and Application in the Organizational Behavior to Nursing Systems (3)
- NURS 6187 Health Informatics & Financial Management for Nurses (3)
- NURS 6188 Strategic Planning & Decision Making in Nursing (3)
- NURS 6212 Program Improvement and Evaluation (3)

Total credit = 12 hours

Additional Certificate Requirements

- 1) Completion of 12 hours of required coursework within four years
- 2) Students must maintain a minimum 3.0 ("B") GPA in their graduate courses and may not accumulate more than two "C" grades
- 3) Access to a computer with minimum requirements for online courses. Current minimum computer hardware specifications are listed by Distance Education online at www.distanceed.uncc.edu.

NURSE EDUCATOR (NE)

(distance education)

This concentration focuses on preparing nurses for advanced practice as a Nurse Educator in a selected area of expertise. Students declare their specialty in their application and develop a portfolio from their graduate work demonstrating their expertise. Graduates are prepared for positions in health systems as clinical educators or academic positions teaching nursing at the entry into practice or RN-BSN levels. Graduates will be prepared to take the NLN certification exam for Nurse Educators.

Additional Admission Requirement

In the essay, include a description of a selected area of specialization in nursing practice. It is expected that the student will develop a portfolio demonstrating expertise in a specialization during this program of study.

Degree Requirements

This program requires completion of 39 semester credit hours in approved courses. Including:

Core Courses: (12 hours)

- NURS 6101 Theoretical Basis for Nursing Practice (3)
- NURS 6160 Research in Nursing (3)
- NURS 6115 Health Policy and Planning in the US (3)
- STAT 6127 Introduction to Biostatistics (3)

System Core Courses: (6 hours)

- NURS 6211 Health Disparities and Nursing (3)
- OR
- NURS 6090 Selected Topics (Study Abroad)
- NURS 6212 Program Improvement and Evaluation (3)

Specialty Courses: (18 hours)

- NURS 6495 Clinical Nurse Specialist Practicum (3)
- NURS 6301 Curriculum & Instruction in Nursing Education (3)
- NURS 6302 Trends and Issues in Nursing Education (3)
- NURS 6303 Instructional Technology in Nursing Education
- NURS 6304 Teaching Nursing Practicum (3)
- Approved Elective (3)

Capstone Course: (3 hours)

- NURS 6601 Synthesis in Advanced Nursing Practice I (1)
- NURS 6602 Synthesis in Advanced Nursing Practice II (2)
- OR
- NURS 6962 Thesis (3)

Additional Degree Requirements

- 1) It is expected that the student will develop a portfolio demonstrating expertise in a specialization during this program of study

- 2) A total of 180 hours in a clinical specialty and 15 hours of supervised classroom teaching experience, individually arranged, is required
- 3) Faculty Advising is required
- 4) Access to computer within minimum requirements for online courses. Current minimum computer hardware specifications are listed by Distance Education online at www.distanceed.uncc.edu.

GRADUATE CERTIFICATE IN NURSING EDUCATION

(distance education)

The Graduate Certificate in Nursing Education is designed to prepare nurses who have a BSN or MSN to become educational leaders in academic and clinical settings. This certificate consists of four courses, for a total of twelve semester hours and can be completed within one calendar year. The Graduate Certificate provides students with the coursework needed to enhance the student's professional teaching skills.

Admission Requirements

- 1) A BSN or Master of Science in Nursing (MSN) degree from a nationally accredited program
- 2) Current unrestricted licensure as a Registered Nurse
- 3) Two official transcripts of all academic work attempted beyond high school
- 4) An essay (statement of purpose) in application packet that includes a description of a selected area of specialization in nursing practice. It is expected that the student will develop a portfolio demonstrating expertise in a specialization during this program of study.
- 5) Three letters of professional recommendation

Certificate Requirements

This program requires 12 semester hours as follows:

- NURS 6301 Curriculum and Instruction in Nursing Education
- NURS 6302 Trends and Issues in Nursing Education
- NURS 6303 Instructional Technology in Nursing Education
- NURS 6304 Teaching Practicum in Nursing Education

Additional Certificate Requirements

- 1) A total of 15 hours of supervised classroom teaching experience, individually arranged, is required
- 2) Access to computer within minimum requirements for online courses. Current minimum computer hardware specifications are listed by Distance Education online at www.distanceed.uncc.edu.

MASTER OF SCIENCE IN NURSING (M.S.N.): COMMUNITY/PUBLIC HEALTH NURSING *(distance education)*

The Community/Public Health Nursing specialty prepares nurses to assume leadership in assessing communities and populations, identifying high risk groups, and in partnership with communities, consumers, and stakeholders, developing culturally sensitive, acceptable and realistic community based nursing services.

Graduates are expected to demonstrate characteristics of practice outlined by the National Association of Clinical Nurse Specialists (2004) and PHN Competencies identified by the Quad Council (2004). Upon graduation, individuals will be qualified to sit for the exam leading to Board Certification by the American Nurses Credentialing Center (ANCC) as an Advanced Public Health Nurse.

Degree Requirements

This concentration requires completion of 38 semester credit hours (44 hours for School Nursing Option) in approved courses including:

Core Courses: (9 hours)

- NURS 6101 Theoretical Basis for Nursing Practice (3)
- NURS 6160 Research in Nursing (3)
- NURS 6115 Health Policy and Planning in the US (3)

Cognate (9 hours)

- HLTH 6202 Community Epidemiology (3)
- STAT 6127 Introduction to Biostatistics (3)
- One Guided Elective (3)

System Core Courses: (6 hours)

- NURS 6211 Health Disparities and Nursing (3)
- OR
- NURS 6090 Selected Topics (Study Abroad)
- NURS 6212 Program Improvement & Evaluation (3)

Specialty Courses: (11 hours)

- NURS 6180 Community/Public Health Nursing (3)
- NURS 6480 Internship I (3)
- NURS 6481 Internship II (3)
- NURS 6210 Family Health in Advanced Practice Nursing (2)

Capstone Course: (3 hours)

- NURS 6601 Synthesis in Advanced Nursing Practice I (1)
- NURS 6602 Synthesis in Advanced Nursing Practice II (2)
- OR
- NURS 6962 Thesis (3)

Additional Degree Requirements

- 1) Courses in the C/PHN specialty area are offered every other year.

- 2) School nurse option courses are only offered when sufficient numbers are admitted.
- 3) Community/Public Health Nursing and School Nurse courses are only offered online through Distance Education. Core and System Core courses can be taken on campus or online as published in the Schedule of Courses.
- 4) A total of 540 clinical hours is required to complete the program.
- 5) Faculty Advising is required.
- 6) Access to computer within minimum requirements for online courses. Current minimum computer hardware specifications are listed by Distance Education online at www.distanceed.uncc.edu.

COURSES IN NURSING

NUAN 6151. Principles of Nurse Anesthesia I. (3)
Prerequisite: NUAN 6156. Overview of the principles, techniques and equipment necessary for the administration of anesthesia for the general surgical client. (*Spring*)

NUAN 6152. Principles of Anesthesia II. (3) Prerequisite: NUAN 6151. Specific techniques of nurse anesthesia practice for selected clients. (*Summer*)

NUAN 6153. Principles of Anesthesia III. (3) Prerequisite: NUAN 6152. Advanced nurse anesthesia practice for selected clients (*Fall*)

NUAN 6154. Pharmacology for Non Anesthetic Agents. (4) Prerequisite: Permission of the Department. Introduction to the pharmacology of anesthetic drugs and adjunctive agents, including general pharmacological principles, pharmacokinetics and pharmacodynamics. (*Fall*)

NUAN 6155. Pharmacology in Anesthetic Agents. (4)
Prerequisite: NUAN 6154. Continuation of Pharmacology I with emphasis on the clinical use of anesthetic agents and adjunctive drugs. (*Spring*)

NUAN 6156. Applied Physics and Chemistry in Nurse Anesthesia. (3) Prerequisite: Permission of the Department. Basic laws and principles of physics, inorganic chemistry and organic chemistry as they apply to the clinical practice of nurse anesthesia. (*Fall*)

NUAN 6157. Applied Pathophysiology in Nurse Anesthesia I. (3) Prerequisite: BIOL 6273. Pathophysiology of the nervous and cardiovascular systems with emphasis on their anesthetic implications. (*Spring*)

NUAN 6158. Applied Pathophysiology in Nurse Anesthesia II. (3) Prerequisite: NUAN 6157. Pathophysiology of the respiratory, endocrine, excretory and renal systems with emphasis on their anesthetic implications (*Summer*)

NUAN 6171. Professional Aspects of Nurse Anesthesia I. (1) Corequisites: NUAN 6153, 6485. Overview of the legal, ethical, and professional aspects regarding the practice of nurse anesthesia and information about the American Association of Nurse Anesthetists, including its history and Councils on Accreditation, Licensure, and Practice. (*Fall*)

NUAN 6172. Professional Aspects of Nurse Anesthesia II. (1) Prerequisite: NUAN 6171. Corequisite: NUAN 6486. Overview of the legal, ethical, and professional aspects regarding the practice of nurse anesthesia and information about the American Association of Nurse Anesthetists, including its history and Councils on Accreditation, Licensure, and Practice. (*Spring*)

NUAN 6485. Clinical Residency in Nurse Anesthesia I. (5) Prerequisite: NUAN 6153. Clinical application of didactic material from the nurse anesthesia curriculum through beginning level practice in the role of a nurse anesthetist. Conferences during the clinical residency provide opportunities to review current research and practice issues. *Pass/Unsatisfactory* grading only. (*Fall*)

NUAN 6486. Clinical Residency in Nurse Anesthesia II. (5) Prerequisite: NUAN 6485. Continuation of the clinical application of didactic material from the nurse anesthesia curriculum with focus on utilization of additional anesthesia techniques and increased skills development. *Pass/Unsatisfactory* grading only. (*Spring*)

NUAN 6487. Clinical Residency in Nurse Anesthesia III. (5) Prerequisite: NUAN 6486. Incorporation of the content of the nurse anesthesia curriculum with opportunities to begin synthesis of all didactic material and techniques for efficient clinical practice. *Pass/Unsatisfactory* grading only. (*Summer*)

NUAN 6489. Clinical Residency in Nurse Anesthesia IV. (5) Prerequisite: NUAN 6487. Non-credit clinical residency for synthesis of all didactic material and techniques of nurse anesthesia clinical practice, promotion of professional practice, and preparation of the student for the licensure examination. *Pass/Unsatisfactory* grading only. (*Fall*)

NUMH 6130. Advanced Psychiatric Mental Health Nursing Practice with Individuals. (2) Prerequisite: NUMH 6200. Corequisite: NUMH 6430. Provides a framework for the examination and application of the therapeutic process by advanced psychiatric mental health nurses with emphasis on theories from nursing as well as psychiatric, behavioral, and cultural sciences. Focuses on the development of the advanced psychiatric mental health nurse in a managed care or traditional health care environment as an individual therapist. (*On demand*)

NUMH 6135. Advanced Practice Psychiatric Mental Health Nursing Practice with Groups and Communities. (2). Prerequisites: NUMH 6130 & 6430. Corequisite: NUMH 6435. Examination of the therapeutic process of advanced psychiatric mental health nursing with emphasis

on groups and communities. Focuses on development of the roles of the advanced practice nurse in a managed care and traditional mental health care environment as a group therapist in the promotion of mental health in community settings. *(On demand)*

NUMH 6200. Psychiatric Mental Health Theories and Constructs of Mental Health Care. (3) Pre-or Corequisite: NURS 6101. Examination of theoretical frameworks underlying the practice of advanced psychiatric mental health nursing. Integration of biological, psychological, sociological and nursing theories into the student's individual theoretical framework for practice. *(On demand)*

NUMH 6201. Seminars in Advanced Practice Psychiatric Mental Health Nursing. (1) Prerequisites: NUMH 6135 & NUMH 6435. Corequisite: NUMH 6401. Focuses on the components and professional issues of the advanced practice psychiatric mental health nurse in the care of the individuals, groups, and communities. Professional practice issues will be addressed. One hour of seminar/case presentation. *(On demand)*

NUMH 6401. Internship in Advanced Practice Psychiatric Mental Health Nursing. (4) Prerequisite: NUMH 6135 and NUMH 6435. Corequisite NUMH 6201. Focuses on the application of the advanced practice psychiatric mental health nurse's role in the care of the individuals, groups, and communities. Professional practice issues will be addressed with preceptors and faculty. *240 clinical practice hours. (On demand)*

NUMH 6430. Practicum in Advanced Practice Psychiatric Mental Health Nursing with Individuals. (2) Prerequisites: NUMH 6200. Corequisite: NUMH 6130. Application of the individual psychotherapeutic process incorporating therapeutic modalities from nursing as well as psychiatric, behavioral, and cultural sciences in selected clinical experiences. Clinical seminar, clinical conference, and faculty/peer supervision provide opportunities for development of the advanced practice psychiatric mental health nurse in a managed care or traditional health care environment. *120 clinical practice hours. (On demand)*

NUMH 6435. Advanced Psychiatric Mental Health Nursing Practice with Groups and Communities Practicum. (2) Prerequisites: NUMH 6130 & NUMH 6430. Corequisites: NUMH 6135. Examination and application of the therapeutic process with emphasis on groups and communities. Clinical seminar, clinical experience and supervision, provide opportunity for development of the advanced practice psychiatric mental health nurse as a group therapist and in promotion of mental health in community settings in a managed care and traditional health care environment. *120 clinical practice hours. (On demand)*

NUNP 6202. Complex Health Care Management of Adults. (3) Prerequisite: NUNP 6250. This course is designed to provide students with the opportunity to

integrate knowledge from advanced assessment, pathophysiology, pharmacotherapeutics, theory and research to provide the advanced practice nurse with the requisite skills in the management of acutely ill adults with chronic illness in a variety of settings. Emphasis is placed on the use of diagnostic reasoning skills in the diagnosis pharmacological, and non-pharmacological management of acutely ill adults with chronic illness. Application of models and theories to guide advanced nursing practice and planned research based care of adult with chronic illness is expected. *(Spring)*

NUNP 6240. Advanced Primary Care Reproductive Health. (3) Prerequisites: NURS 6220, NURS 6230, NURS 6430. Pre or Corequisite: NUNP 6250. Focuses on the role of the nurse practitioner in the primary care of family members in the reproductive stages. The course uses a developmental approach to provide knowledge needed for advanced understanding and care of common health concerns related to the reproductive organs, including the genitourinary, and reproductive cycles of men and women. Concepts of health promotion, health maintenance, cultural competence and environmental variations are integrated throughout the course. *(Spring)*

NUNP 6250. Advanced Primary Care and Health Promotion of Adults. (3) Prerequisites: NURS 6230, NURS 6430, NURS 6220. This course will build on knowledge of advanced assessment, pathophysiology, pharmacotherapeutics, and theory and research to provide the advanced practice nurse with the framework to manage adults with chronic illness in the ambulatory setting. Emphasis is placed on a wellness focus in the care of adults throughout the life span with common reoccurring acute illnesses and stable chronic conditions. Models of health promotion, disease prevention, health education and wellness will be used to guide the advanced practice nurse in assessing, diagnosing and planning care for adults. The case study approach will be used as a framework to implement the diagnostic reasoning and clinical decision making process. *(Fall)*

NUNP 6260. Advanced Primary Care of Children and Adolescents. (3) Prerequisites: NURS 6220, 6230, 6430, NUNP 6250, 6450. Corequisite: NUNP 6460. Focus is on the role of the family nurse practitioner in the primary care of families with children and adolescents. The course uses a developmental approach to providing knowledge needed for advanced clinical decision making related to children with common health problems including acute episodic illness and stable chronic disease. Concepts of health promotion and maintenance and cultural and environmental variables are integrated throughout. *(Spring)*

NUNP 6400. Internship in Family Health Nursing. (4) Prerequisite: NUNP 6240, 6250 and 6260. Role of the family nurse practitioner in the assessment and management of the health of individuals and families across the lifespan. Implementation of clinical decision making skills in family health promotion and management of acute episodic and

stable chronic conditions and consideration of professional practice issues. Includes one credit hour of seminar/case presentation and three credit hours of clinical practice (240 clinical hours) (*Summer*)

NUNP 6401. Advanced Practice Nursing in Ambulatory Care Practicum. (4) Pre or corequisites: NUNP 6250, NUNP 6240. Emphasis on the role of the advanced practice nurse in promoting healthy life-styles to prevent or minimize the effects of chronic illness. Students will incorporate critical thinking and diagnostic reasoning in assessing, diagnosing, monitoring, coordinating, managing outcomes and communicating health care findings of adults and their families in ambulatory care settings. (240 supervised clinical hours) (*Fall*)

NUNP 6402. Advanced Practice Nursing in Complex Care Practicum. (4) Pre- or corequisite: NUNP 6202. This clinical course focuses on treatment and outcome management of complexly ill clients with multi-system problems. Emphasis on the role of the advanced practice nurse in helping complexly ill adults manage the effects of and achieve optimum outcomes in chronic illness. (240 supervised clinical hours) (*Spring*)

NUNP 6403. Advanced Practice Nursing in Specialty Care of Adults Practicum. (2) Prerequisite: NUNP 6402. This clinical course focuses on outcome management of adults in specialty care settings of the student's choice with faculty approval. Emphasis is on the role of the advanced practice nurse in developing, implementing and evaluating advanced care of adults. Clinical experiences are designed to provide opportunities in management, quality assurance and achievement of optimum outcomes in specialty practice settings. (120 supervised clinical hours) (*Summer*)

NUNP 6440. Advanced Primary Care Reproductive Health Practicum. (2) Co- or Prerequisite: NUNP 6240. This clinical course is designed to provide the family nurse practitioner student with the opportunity to manage the reproductive and GU care in primary care settings. The course uses a developmental approach to increase competence in providing care to clients from diverse backgrounds. The focus is on the synthesis of knowledge from the physical and psychosocial sciences to formulate advanced clinical decisions effective in reproductive health care. (120 supervised clinical hours) (*Spring*)

NUNP 6450. Advanced Primary Care and Health Promotion of Adults Practicum. (2) Pre- or Corequisite: NUNP 6250. This clinical course is designed to provide family nurse practitioner students the opportunity to manage the health care of adults in primary care settings. The course uses a developmental approach to manage the care of adults from diverse backgrounds. The focus is on the synthesis of knowledge from the physical and psychosocial sciences to formulate advanced clinical decisions effective in the health care of adults and their families. (120 supervised clinical hours) (*Fall*)

NUNP 6460. Advanced Primary Care of Children and Adolescents Practicum. (2) Prerequisite: NURS 6220, 6230, 6430; NUNP 6250, 6450. Corequisite: NUNP 6260. This clinical course is designed to provide family nurse practitioner students the opportunity to manage the health care of children and adolescents in primary care settings. The course uses a developmental approach to guide management of the healthcare of children and adolescents from diverse backgrounds. The focus is on the synthesis of knowledge from the physical and psychosocial sciences to formulate advanced clinical decisions effective in the health care of children and adolescents and their families. 120 clinical hours. (*Spring*)

NURS 6090. Selected Topics in Nursing. (1-3) Prerequisite: Permission of instructor. Topics to be chosen from the specialties of nursing. May be repeated for credit as topics vary. No more than six hours of topics and/or independent study course credit in nursing may be applied toward degree requirements. (*Fall, Spring*)

NURS 6100. Chronic Illness Concepts and Theories for Advanced Nursing Practice. (3) Pre- or Corequisite: NURS 6101. Focus on contemporary chronic illness concepts and theories relevant to individuals and families coping with long-term health deviations and their impact on society. Emphasis on knowledge and skills needed for advanced nursing practice. (*On demand*)

NURS 6101. Theoretical Basis for Nursing Practice. (3) Philosophical foundations and knowledge development in nursing. Evaluation of theories, models and their relationships to practice. (*Fall, Spring, Summer*)

NURS 6115. Health Policy and Planning in the U.S. (3) Overview of health care delivery system in the United States. Analysis of health care policy, financing, political trends, ethical, and professional issues, including the theoretical underpinning of policy making, the empirical thrusts of policy analysis and research and the relationship between policy making and the political process. (*Fall, Spring, Summer*)

NURS 6150. Health of Immigrant Populations in the United States. (3) This course examines the health of immigrant populations within the context of a nation of origin, the process of migration, and resettlement experiences. Explores theoretical frameworks that may explain socialization of groups to surrounding societies. Examines selected traditional healing modalities and essential components of culturally competent health care practice. (*On demand*)

NURS 6160. Research in Nursing. (3) Methods of inquiry for research will be explored and critiqued. Emphasis on translational research for evidence based practice and program evaluation. (*Fall, Spring, Summer*)

NURS 6162. Information Resource Management. (3) Adaptation of technological innovation (Informatics) to the

field of nursing, including theoretical and applied computer utilization, patient acuity and quality assurance components to the professional practice of nursing. This course is cross referenced with HADM 6146 Information Resource Management, which is taught every spring. *(On demand)*

NURS 6175. Nursing Informatics. (3) Adaptation of technological innovation (Informatics) to the field of nursing, including theoretical and applied computer utilization, patient acuity and quality assurance components to the professional practice of nursing. *(On demand)*

NURS 6180. Community/Public Health Nursing Theory and Practice. (3) This course examines how population-based theories and practice inform advanced practice community/public nursing in communities and schools. It focuses on core public health functions and competencies, public health law and ethics, the role of C/PHN in influencing public health policies, Healthy People goals and objectives, and collaboration with communities to assess, plan, develop, implement, and evaluate culturally competent health promotion programs. *(Spring)*

NURS 6185. Theory and Application in the Organizational Behavior to Nursing Systems. (3) Prerequisite: NURS 6101 or permission of the instructor. Examination of organization theory, management theory and their applications to critical nursing administrative leadership issues. Standards and Frameworks of competencies in Nursing Administration are reviewed as guidelines for career development. Evidence based management and promotion of a culture of safety is explored as a basis for health related organizational development. (3) *(Summer, Odd years)*

NURS 6187. Health Informatics and Financial Management for Nurses. (3) Pre- or corequisite: NURS 6185; Prerequisite: NURS 6101 or permission of the instructor. This course emphasizes the managerial aspects of health administration finance that nurse managers need in order to interact with the information technology applications utilized in financial and budgeting systems. Increasingly financial decisions are influenced by information gathered using multiple media and resources. Budget and internal control, including auditing concepts and techniques are introduced as management control techniques. The following financial methods are presented as decision models for creating a culture of safety: forecasting, capital budgeting, and capital access. In addition, the managerial implications of cost analysis, cost behavior, capital investment decisions, equity and debt financing, and lease/purchase decisions are included. *(Summer, Odd years)*

NURS 6188. Strategic Planning and Decision Making in Nursing. (3) Pre or corequisite: NURS 6185; Prerequisites: NURS 6101, NURS 6160; or permission of the instructor. Topics will cover strategic decision making and problem solving theories and techniques for analysis and forecasting with attention to the processes and context of

the situation. Strategic planning addresses identifying system vulnerabilities in building safety and resilience in an organization. Students will learn to apply selected descriptive and inferential statistical quantitative management tools useful in the analysis of managerial decisions and how to interpret findings. Avoiding common decision errors that occur because of faulty, ingrained mental models will be explored. *(Fall, Odd years)*

NURS 6206. Health Assessment for School Nurses. (3) This course provides the knowledge and skills for school nurses to incorporate concepts from growth and development in a comprehensive health assessment of diverse children and adolescents. The focus is on identifying normal parameters and providing health promotion interventions. (3) *(On demand)*

NURS 6207. Care of the Child and Adolescent in Schools. (3) Prerequisites: NURS 6206. Provides knowledge and skills for needed by advance practice C/PHNs to manage the health of children and adolescents in schools. Builds on knowledge base of child and adolescent growth and development. Concepts of health promotion, family theory, behavioral health, culture and environmental health are integrated throughout the course. *(On demand)*

NURS 6210. Family Health in Advanced Practice Nursing. (2) Provides an overview of the family as the basic unit of advanced nursing care. Focuses on strategies of family assessment, family empowerment, and family health promotion. Includes reviews of relevant theories, concepts and research for the assessment and management of family health and the analysis of the socio-cultural context of families. *(Fall or Spring)*

NURS 6211. Health Disparities and Nursing. (3) This course examines various theoretical frameworks relative to interactions of ethnic heritage, cultural environment, and social/racial stratification, and development of cultural competence in Advanced Nursing Practice. It examines ethical, legal, regulatory standards that inform advanced practice and evaluates alternative strategies that nurses in advanced practice can use to provide culturally competent interventions to diverse populations, patients, organizations, and communities. *(Fall)*

NURS 6212. Program Improvement and Evaluation. (3) This course focuses on planning, evaluating, and improving health programs. Includes steps in problem analysis and needs assessment, logistics of program management and implementation, evaluation, and quality improvement within systems and community oriented advanced nursing practice. *(Spring)*

NURS 6220. Pharmacotherapeutics in Advanced Nursing Practice. (3) Principles of pharmacology and drug therapy for advanced nursing practice including legal and social considerations related to prescriptive authority and prescribing patterns. Satisfies NC Board of Nursing requirements for nurse practitioner. *(Fall)*

NURS 6230. Health Assessment and Diagnostic Reasoning for Advanced Practice. (3) Pre or corequisite: BIOL 6274. Corequisite: NURS 6430. This course provides knowledge and skills necessary for advanced practice nurses to synthesize concepts from nursing and the biopsychosocial sciences in the comprehensive health assessment of adults and children. The diagnostic reasoning process, differential diagnosis, advanced health evaluation techniques, laboratory tests, diagnostic studies and interpretation and evaluation of findings are incorporated into the course. *(Spring)*

NURS 6275. Health Promotion and Wellness for Older Adults. (3) Crosslisted as GRNT 6275. Self-care measures and health promotion practices to promote a healthy lifestyle are discussed. Included are principles of teaching and learning adapted to the older client needed by health care and other professionals who teach and plan programs for the older client. Common barriers to health care of older adults are examined. *(On demand)*

NURS 6301. Curriculum and Instruction in Nursing Education. (3) Online course. Theories and principles of adult learning. Curriculum/course planning, design, implementation, and evaluation. Creative teaching approaches and technologies. Evaluation of student learning, including test construction. Teaching/learning/evaluation in the clinical setting. *(Spring or Summer)*

NURS 6302. Trends and Issues in Nursing Education. (3) Online course. Examination of current trends and issues that nursing educators face: faculty roles and responsibilities, student diversity, student roles and responsibilities, scholarship of teaching, leadership in nursing education, evaluation of teaching effectiveness, curriculum evaluation/accreditation, and legal and ethical issues. *(Summer)*

NURS 6303. Instructional Technology in Nursing Education. (3) Online course. Introduction to instructional design using a variety of computer and technology-based media. The focus is on assisting students to gain skills in choosing appropriate instructional technologies in enhancing learning in both traditional and clinically-based educational settings. *(Summer)*

NURS 6304. Teaching Practicum in Nursing Education. (3) Prerequisites: NURS 6301, 6302, 6303. Guided experience with a master teacher in nursing for classroom and clinical teaching and evaluation, planned in the student's locale by student and faculty, plus on-line discussion forum. Design of a teaching portfolio. Design, implementation, and evaluation of course/class/clinical content. *(Fall)*

NURS 6430. Advanced Health Assessment Practicum. (1) Pre or corequisite: BIOL 6050 Pathophysiology. Corequisite: NURS 6230. This clinical practicum is designed to provide an opportunity for students to practice

advanced health assessment skills on clients across the lifespan. Comprehensive health histories and physical examination techniques are used to complete a database on clients to formulate differential diagnoses and make advanced clinical decisions. 60 lab/clinical hours. *(Spring)*

NURS 6480. Community/Public Health Nursing Internship I. (3) Pre or corequisite: NURS 6180, HLTH 6202, NURS 6211, and NURS 6212. Corequisite: NURS 6601. Internship I is the first of a two-semester clinical course for students in population or school nursing options. It is competency-based and is designed to reflect population-based advanced practice nursing in multiple settings. Students work under direct supervision of an assigned MSN-prepared preceptor to assess the need for a project and then to design an intervention. The internship builds on knowledge and skills from prior courses in the program. Placement with a preceptor is determined individually in consultation with the student. (180 clinical hours) *(Fall, Even years)*

NURS 6481. Community/Public Health Nursing Internship II. (3) Prerequisite: NURS 6480, NURS 6601. Internship II is the second of a two-semester clinical course that builds on knowledge and skills from prior courses in Community/Public Health Nursing. It is competency-based and is designed to reflect population-based practice in multiple settings. Students work under direct supervision of an assigned MSN-prepared preceptor to assess the need for a project and then to design an intervention. Placement continues with the same preceptor from Internship I (180 clinical hours) *(Spring, Even years)*

NURS 6485. Advanced Practicum in Nursing Administration and Leadership. (3) Prerequisite: NURS 6185. This practicum provides a guided administrative experience in a health related agency. Designed as a course where students synthesize nursing research, practice and theory in a project for improving the culture of safety under the supervision of a selected preceptor. 180 clinical hours. *(Spring, Even years)*

NURS 6495. Clinical Nurse Specialist Practicum. (3) This clinical course will emphasize clinical nurse specialist practice. The students will advance their clinical nursing expertise within a chosen specialty including the integration and application of client assessment and management skills in diverse settings. The student will gain and understating of the role of the CNS including the prevention and treatment of illness and promotion of health within the care of individuals, families, groups and communities. *(Fall)*

NURS 6601. Synthesis in Advanced Nursing Practice I. (1) The course sequence NURS 6601 and 6602 is taken in the last year of the student's program of study. Emphasis is on synthesizing theory, research and practice through a project that involves collaboration with faculty and possibly a health related agency. Over two semesters students design and conduct a mentored research, educational or program improvement / community capacity building project. This

clinical course focuses on the planning, internal approval and development phase. (*Fall*)

NURS 6602. Synthesis in Advanced Nursing Practice II. (2) Prerequisite: NURS 6601. The course sequence NURS 6601, NURS 6602 is taken in the last year of the student's program of study. Emphasis is on synthesizing theory, research and practice through a project that involves collaboration with faculty and possibly a health related agency. Over two semesters, students design and conduct a mentored research, educational or program improvement/community capacity building project. This course focuses on the implementation and dissemination phases. (*Spring*)

NURS 6661. Research Seminar. (2) Prerequisite: NURS 6160 and graduate statistics. Application of inquiry methods to nursing problems including systematic observation and critical analysis of research methods. Submission of a written research or project proposal is required. (*On demand*)

NURS 6895. Independent Study. (1-3) Guided individual study in topics or issues related to nursing arranged with a faculty adviser. May be repeated for credit. No more than six hours of topics and/or independent study courses may be counted toward degree requirements. (*Fall, Spring, Summer*)

NURS 6962. Thesis. (1-3) Prerequisite: NURS 6160. Production of a piece of nursing research of investigation of a problem relevant to nursing which demonstrates contribution to professional knowledge through systematic investigation and participation in the process of peer reviewed research. (*Fall, Spring*)

NURS 7999. Master's Degree Graduate Residency Credit. (1) Prerequisite: Permission of the adviser. Required of all graduate studies working on a thesis who are not enrolled in other graduate courses. (*Fall, Spring, Summer*)

Public Health

- **Master of Science in Public Health (MSPH)**
- **Graduate Certificate in Community Health**

Department of Public Health Sciences

431 College of Health and Human Services
704-687-7191

<http://publichealth.uncc.edu>

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MASTER OF SCIENCE IN PUBLIC HEALTH (MSPH)

The Master of Science in Public Health (MSPH) program prepares graduate students through research and practice experiences to apply core principles of public health education within a variety of community settings and to advance the public health profession. Students develop specialized skills to assess health behavior and to design, deliver, and evaluate health promotion and both risk prevention and risk reduction services. Graduates will apply knowledge from the social, behavioral, and health sciences to address and solve pressing public health problems. The program consists of core content courses, practice options, a capstone experience, and a required internship. The program prepares students to provide leadership in a variety of settings including health-related agencies and organizations, hospitals, local and state public health departments, academic research centers and institutes, corporate disease management and wellness programs, non-profit agencies, and healthcare businesses and industries.

Program Goals

The MSPH program includes instructional, research, and service goals to prepare graduate students through research and practice experiences to apply core principles of public

health education within a variety of community settings and to advance the public health profession.

Instructional Goals:

- Develop student competency in the core areas of public health
- Provide opportunities for student development as a practice professional
- Create opportunities for application of knowledge and skills in community health settings
- Demonstrate community health competencies by completing a capstone thesis or project

Research Goals:

- Engage students in independent and collaborative health research programs
- Develop oral and written communication skills to disseminate public health scholarship
- Prepare students to compete for funding for community health programs and evaluation

Service Goals:

- Engage students in public health-related activities and programs in the community
- Involve students in public health program administration
- Encourage student involvement in related local, regional, and national professional organizations

Additional Admissions Requirements

- 1) Acceptable scores on both the verbal and quantitative portions of the Graduate Record Examination (GRE).
- 2) Undergraduate major or coursework that prepares students for graduate work.
- 3) Submission of official scores on the Test of English as a Foreign Language (TOEFL), the Michigan English Language Assessment Battery (MELAB) or the International English Language Testing System (IELTS), if English is not the applicant's native language and he or she has not earned a post-secondary degree from a U.S. institution. Required is either a minimum score of 557 on the paper-based TOEFL, a minimum score of 220 on the computer based TOEFL, a minimum score of 83 on the Internet based TOEFL, a minimum score of 78 percent on the MELAB, or a minimum total score of 6.5 on the IELTS. Applicants from certain countries are exempt from the English language proficiency requirement.

Degree Requirements

The curriculum leading to the Master of Science in Public Health degree requires a minimum of 45 semester hours of graduate credit including 21 hours of core courses, an internship experience (3 credit hours), a capstone thesis (6 credit hours) or project (3 credit hours), the completion of a specialty area (9 credit hours), and electives (6-9 credit hours).

Core Requirements (21 hours)

- HLTH 6201 Social and Behavioral Foundations of Public Health (3)
- HLTH 6202 Community Epidemiology (3)
- HLTH 6203 Public Health Data Analysis (3)
- HLTH 6204 Public Health Research Methods (3)
- HLTH 6205 Environmental Health (3)
- HLTH 6206 Health Services Administration (3)
- HLTH 6207 Community Health Planning and Evaluation (3)

Additional Requirements (24 hours)

- HLTH 6471 Internship (3)
- HLTH 6900 Research and Thesis (6) OR HLTH 6901 Project (3)
- Specialty Area (9 hours)
- Electives (6-9 hours)

Specialty area *

Community Health Practice (9 hours):

- HLTH 6220 Health Behavior Change (3)
- HLTH 6221 Community Health (3)
- HLTH 6222 Methods in Community Health (3)

**Based on student interest, course availability, and program goals, the Graduate Coordinator may approve (in advance) another set of related courses to fulfill the specialty area requirement.*

Assistantships

Positions as a graduate administrative assistant may be available. Research assistantships may be available as well, and are competitively awarded. Students seeking assistantships should contact the Program Coordinator in the Department of Public Health Sciences for additional information.

Internships

The internship is an intensive, supervised experience and is required for all students. Students assume a professional role in a community health setting and demonstrate the ability to apply research and theory in a field-based setting, and to assume leadership roles. Internship experiences are designed and approved in concert with the Program Coordinator or other faculty advisor. Students register for HLTH 6471 (3 hours) during the internship period. *Note: A criminal background check and drug screen are among the internship requirements. Students who fail these screening measures and who are unable to be placed in an internship face dismissal from the program.*

Capstone Experiences

Each student is required to complete either a capstone thesis or project. In all cases, the capstone experience must be of the student's own design, demonstrate independent learning, and originate under the supervision of a faculty advisor and at least two additional graduate faculty committee members.

Advising

Upon acceptance into the program an academic advisor is assigned to each student. Students are expected to meet with their advisors on a regular basis to plan their progression through their program of study. The Program Coordinator must approve, in writing, all course substitutions. Each student must also assemble a graduate committee for development and evaluation of the capstone thesis or project. Members of the committee include the student's thesis advisor and at least two other graduate faculty members who represent major areas of concentration in the student's program.

Program Certifications/Accreditations

Upon completion of the degree graduates are eligible to take the Certified Health Education Specialist (CHES) examination administered by the National Commission for Health Education Credentialing.

Research Opportunities/Experiences

A range of research opportunities exists in the Department of Public Health Sciences and in the College of Health and Human Services for students to conduct both independent and collaborative research projects.

Tuition Waivers

Tuition waivers are available to some students with assistantships.

Financial Aid/Financial Assistance

Financial aid and assistance is available to qualifying students, which may be accessed through the financial aid office. See the financial information section of this *Graduate Catalog* for more information on the opportunities that are available, and how to contact the financial aid office.

GRADUATE CERTIFICATE IN COMMUNITY HEALTH

The Graduate Certificate Program in Community Health contributes to the preparation of community and public health practitioners to take the Certified Health Education Specialist (CHES) examination. The Certificate is also available to students who wish to complement an existing degree in a health profession (for example, nursing or social work), or who wish to explore a career in public health. Completion of the certificate program does not provide admission to the MSPH degree program.

Admission Requirements

Students are admitted to the Graduate School in a special category for certificate programs. See general information on admission to graduate certificate programs elsewhere in this catalog.

Certificate Requirements

The program leading to a Graduate Certificate in Community Health requires a minimum of 15 semester hours of graduate credit including 6 hours of core courses, a restricted elective course (3 credit hours), and two additional elective courses (6 credit hours). Students should plan their program of study in consultation with the Graduate Coordinator.

Core Courses (6 hours)

- HLTH 6207 Community Health Planning and Evaluation (3)
- HLTH 6220 Health Behavior Change (3)

Restricted Elective Course (3 hours)

(Choose One Course)

- HLTH 6201 Social and Behavioral Foundations of Public Health (3)
- HLTH 6221 Community Health (3)

The remaining six (6) credits are chosen by the student in consultation with the Program Coordinator and faculty from among available departmental offerings. Courses from outside the Department of Public Health Sciences may be substituted with written permission of the Coordinator.

Transfer credits are not accepted in the Certificate program.

COURSES IN PUBLIC HEALTH

HLTH 5120. Mental and Emotional Well-Being. (3)

Examines mental and emotional health from the perspective of the health educator's role as facilitator of mental and emotional wellness *(2 year cycle)*

HLTH 5122. Drugs and Society. (3) Teaching methodology, knowledge and skills for affecting appropriate behaviors through the study of use, misuse and abuse of natural and synthetic chemicals in today's society *(On demand)*

HLTH 5124. Safety Through the Life Span. (3)

Prerequisite: Consent of the department. Introduction to accident/injury prevention emphasizing personal responsibility for health care with a focus on psycho-social development and a wellness approach to safety management *(On demand)*

HLTH 5126. Adolescent Sexuality and Family Life

Education. (3) Designed for teachers, counselors, school nurses, administrators and others responsible for family life education programs in school, with focus on adolescent sexuality issues. *(2 year cycle Summer)*

HLTH 5130. Applied Nutrition for Today's Consumer. (3)

Principles of nutrition, dietary guidelines, dietary relationships to diseases and health, special populations, computerized dietary analysis. *(2 year cycle)*

HLTH 5136. Health Product and Service Consumerism. (3) Teaching methodology, knowledge and skills for affecting appropriate health behaviors through emphasis on the individual consumer at the health marketplace. (*On demand*)

HLTH 6000. Special Topics. (1-4) Prerequisite: permission of department. Courses in selected topics and advanced studies in public health. May be repeated for credit as topics vary. Lecture hours will vary with the courses taught. (*On demand*)

HLTH 6090. International Comparative Health Systems: Western Europe. (3) Crosslisted as NURS 6090. A two-week study tour to explore the cultures, social, and health care systems in Western Europe and to compare them with systems in the United States. Participants will visit a variety of health care sites and attend presentations by practitioners and educators. They will have opportunities to interact with people from the host countries and visit a variety of cultural and historic sites.

HLTH 6151. Coordinating the School Health Education Program. (3) Examines the school health education program from the perspective of the school health education coordinator. (*On demand*)

HLTH 6153. Worksite Health Promotion. (3) Prerequisite: consent of the instructor. An exploration of the practices of promoting health in various settings for a variety of consumers. (*Yearly*)

HLTH 6155. Health Risk Reduction and Disease Prevention. (3) Personal/professional management of risk factors and lifestyle intervention processes for leading causes of mortality and morbidity. (*On demand*)

HLTH 6201. Social and Behavioral Foundations of Public Health. (3) Introduction to concepts and theories from the social and behavioral sciences relevant to public health practice and research. Effects of selected social and psychological factors including demographic, socioeconomic and life style indicators on health (*Fall*)

HLTH 6202. Community Epidemiology. (3) Crosslisted as HADM 6104. Principles and methods of epidemiology including definitions and models of health, illness and disease; modes of transmission of clinically important infectious agents; risk factors and chronic diseases; and insights into existing studies and paradigms of health promotion and disease prevention. (*Fall*)

HLTH 6203. Public Health Data Analysis. (3) A foundations graduate course designed to develop understanding and skill in data analysis and interpretation in research related to public health. Students will have opportunities to develop basic skills in data analysis, computer use, data interpretation, and the presentation/communication of results. (*Spring*)

HLTH 6204. Public Health Research Methods. (3) An introductory graduate course designed to expose students to the processes and techniques necessary to conduct relevant social and behavioral science research in public health. The course explores the fundamental concepts of research design, sampling, data collection, and data analysis. Students will develop understanding and proficiency in commonly used public health measurement procedures and techniques, and how to estimate the adequacy of those procedures for communities and populations. (*Fall*)

HLTH 6205. Environmental Health. (3) Contemporary environmental factors including biological, physical, and chemical factors which affect the health of a community. Traditional elements of environmental health, including the control of infectious diseases, toxicology, and environmental health policy and practices at local, state, and federal levels. (*Spring*)

HLTH 6206. Health Services Administration. (3) Introduction to organizational theory with applications to health care systems, including organizational design and inter-organizational networks and alliances. Examination of communication and leadership skills development, including conflict, labor and dispute management. (Same as HADM 6145) (*Fall*)

HLTH 6207 Community Health Planning and Evaluation. (3) The use of community and behavioral analysis as a basis for establishing program goals and objectives, for determining appropriate methods to study health-related interventions, for carrying out planned intervention programs, and for evaluating behavioral change outcomes. (*Spring*)

HLTH 6220. Health Behavior Change. (3). Assessment of psychosocial, cultural and situational factors in the voluntary behavior change process; theories of health behavior. (*Spring*)

HLTH 6221. Community Health. (3) The nature of communities as social systems. Principles and practices relevant to community health. (*Spring*)

HLTH 6222. Methods in Community Health. (3) Prerequisite: HLTH 6221. Methods based on the ecological model of health for planning community health interventions including strategies directed at policy, community, institutional, inter- and intra-personal levels. (*Spring*)

HLTH 6224. Measurement in Health Sciences. (3) Prerequisites: HLTH 6204. The purpose of this course is to educate students on applied measurement techniques used in the health sciences. The skills obtained from this course will be useful in health related program evaluations, testing of models of health theories, development of health surveys, and health needs assessments. It includes an exploration of methods for establishing reliability and validity estimates. (*On demand*)

HLTH 6231. Advanced Data Analysis in Health Research. (3) Prerequisite: HLTH 6203. Advanced statistical and data analysis techniques used in the health professions. This course is designed to increase students' abilities to use health-related computer software. (*On demand*)

HLTH 6260. Analytic Epidemiology. (3) Crosslisted with HSRD 8003. Prerequisite: HLTH 6202 (Community Epidemiology) and permission of instructor. Principles and methods of studying advanced epidemiology, with emphasis on the analytic approach. Includes: advanced techniques in the establishment of disease causation in groups and communities. Such topics as risk assessment, environmental exposures, stratification and adjustment, and multivariate analysis in epidemiology are covered. Emphasis is also placed on quality assurance and control and communicating results of epidemiological studies in professional publications and settings. (*Fall*)

HLTH 6279. International Health. (3) Principles and methods of studying international health, including historical background, sources and problems associated with health data, the social context, the role of government and non-government agencies, health in relation to environment and development, international health projects, defining the international health sector, infectious disease problems, and the practice of international health. (*Every 2 years*)

HLTH 6346. Evaluation of Community Health Programs. (3) Prerequisite: HLTH 6207 or permission of the instructor. The purpose of this course is to teach students methods for evaluating community health programs. Students will learn and apply various evaluation techniques including formative, retrospective, and monitoring; survey and trend analysis; application of experimental and quasi-experimental design; triangulation of data; and evaluation report development. (*On demand*)

HLTH 6471. Internship. (3) Prerequisites: Completion of 18 or more graduate credit hours and permission of the Graduate Coordinator. Intensive, supervised experience in the practice of public health in community settings. *Pass/No Credit or IP* grading only. (*Every semester*)

HLTH 6600. Seminar in Public Health. (1-6) Prerequisite: permission of department. Seminar in selected current topics and advanced studies in public health. May be repeated for credit as topics vary. (*On demand*)

HLTH 6800. Tutorial. (1-3) Directed study in areas of specialization in public health and related fields. Maximum credit toward degree: three hours. *Pass/No Credit or IP* grading only. (*Every semester*)

HLTH 6900. Research and Thesis. (1-6) Prerequisite: Completion of at least 21 hours of graduate program (HLTH 6201 through HLTH 6207) or permission. A capstone synthesis course in which the candidate

demonstrates independent learning thorough application of public health research skills to solve a problem or hypothesis. The thesis is of the student's own design conducted under the supervision of an advisor and graduate committee. *Pass/No Credit or IP* grading only. (*Every semester*)

HLTH 6901. Project. (1-3) Prerequisite: Completion of at least 21 hours of graduate program (HLTH 6201 through HLTH 6207) or permission. A capstone synthesis course in which the candidate demonstrates independent learning thorough application of public health research skills to a problem or opportunity in a community health setting with a target population. The project is of the student's own design conducted under the supervision of an advisor and graduate committee. *Pass/No Credit or IP* grading only. (*Every semester*)

HLTH 7999. Master's Degree Graduate Residency Credit. (1) Independent research. Required of all master's degree students who are working on a capstone activity but not enrolled in other graduate courses. (*Every semester*)

Social Work

• Master of Social Work (MSW)

Department of Social Work

College of Health and Human Services
704-687-7938
www.socialwork.uncc.edu

Chairperson

Dennis D. Long, Professor

Graduate Faculty

Suzanne Boyd, Associate Professor
Reba Brown, Lecturer & Assistant Coordinator of Field Education
John Doherty, Lecturer
James Dudley, Professor Emeritus
Robert Herman-Smith, Assistant Professor
Gay Jordan, Lecturer & Coordinator of Admissions
Shanti Kulkarni, Assistant Professor
Courtney Lynch, Assistant Professor
Sue Marchetti, Lecturer & Coordinator of Field Education
Terri Matthews, Lecturer
Susan McCarter, Assistant Professor
Blanca Ramos, Associate Professor
Diana Rowan, MSW Coordinator
Jeffery Shears, Associate Professor, BSW

MASTER OF SOCIAL WORK

The Master of Social Work (MSW) degree prepares students for advanced social work practice with individuals, families, and small groups in a variety of public, voluntary, and proprietary human service settings. Graduates are skilled in addressing the many social and individual problems of society—especially for those who constitute membership in low income and vulnerable groups.

The course of full-time study over four semesters requires 60 hours of course work beyond the bachelor's degree from an accredited college or university. An extended program (also 60 hours) is available that students can complete in three years. The Advanced Standing MSW Program consists of 42 hours of credit and spans over one calendar year of full-time study. The UNC Charlotte MSW degree is fully accredited by the Council on Social Work Education, the national accrediting organization for social work education programs.

The MSW curriculum concentration is in interpersonal practice which is centered in advanced social work practice with individuals, families, and small groups. In addition, students also select a Field of Practice Emphasis from one of three areas—Health/Mental Health; Families and Children; or Aging—to further deepen their expertise in interpersonal practice. Graduates are employed in a range of human service settings, including youth and family agencies, child and adult protective services, schools, area mental health agencies, substance abuse centers, health care settings, and neighborhood service centers.

Additional Admission Requirements

Full-time and extended study students begin in the Fall semester. Advanced Standing students begin in May. Admission is selective, in addition to the general requirements for admission to the graduate school, applicants for the M.S.W. program:

- 1) Must have a minimum grade point average of 3.0 for the last two years and 2.75 overall for their undergraduate work. Advanced standing students must have a B.S.W. degree from a Council on Social Work Education (C.S.W.E.) accredited program and have a 3.5 grade point average in the last four years of study.
- 2) Acceptable scores on the GRE. The total quantitative and verbal scores should be in the range of 1000; previous accepted scores averaged 940. Marginal GRE scores may be offset by other exceptionally strong components of the application. Applications with total scores below 800 are considered marginal but would not omit the applicant from consideration.
- 3) Must present evidence of having a liberal arts foundation for MSW study. Courses in statistics and human biology are required. In addition, transcripts may be evaluated for a liberal arts foundation with courses in the humanities, the social and behavioral sciences, and the physical sciences, for example.

- 4) Social work applicants are required to submit the Statement of Purpose Form included in the graduate online application, but this should be expanded to four or five pages in length to include the following:
 - a) Your reasons for seeking graduate social work education at this time. If you are currently working in a social service job, explain your reasons for pursuing further formal education. If you are changing fields, discuss your reasons for doing so. Explain why you are making this change now.
 - b) How your life experiences have led you to seek a graduate social work degree. How do you account for your interest in social work?
 - c) Your personal strengths and limitations for the practice of social work.
 - d) The particular aspects of social work that interest you most.
 - e) What do you see yourself doing professionally five years in the future?
 - f) Diversity is a valued aspect of the social work program. How do you think you might enrich the class with your cultural experiences, unique skills, and interest?
 - g) Your activities in social work organizations and any honors you have received.
 - h) Your signature and date.
- 5) An attachment to the essay outlining the applicant's educational, work and volunteer experience, and special skills or attributes. The attachment should total no more than two pages and should be in resume format to include:
 - Personal data: Name, address, phone number, email address
 - Educational experience: Institutions and the dates you attended
 - Your academic degrees awarded, include majors and minors
 - Work experience: List all positions in chronological order (beginning with most recent) with a 2-3 line job description for each.
 - Include all beginning and ending dates for each position.
 - Identify if a MSW or a BSW level social worker supervised you.
 - Indicate whether the position was full-time or part-time.
 - Volunteer experience: List all positions in chronological order (beginning with most recent) with a 2-3 line job description for each.
 - Include all beginning and ending dates for each position.
 - Identify if an MSW or a BSW level social worker supervised you.
 - Professional affiliations and honors from your school, profession, or community:
 - List any memberships in professional organizations and service groups
 - List any offices held in these organizations.
 - Add honors or special awards received.
- 6) Three Letters of Recommendation Forms. If you are a graduate within the past 5 years, at least two must be

from faculty members. For applicants who have been out of the education system for some time, letters should be from someone who can comment on your suitability for graduate education. It is recommended that at least one reference be from a professional working in the applicant's field of interest.

- 7) Applicants may be required to participate in an interview process.

Upon acceptance to the program, students will be asked to complete an Intent to Enroll Form and a Field Application Form. Because some field placement agencies serving vulnerable populations exclude personnel with criminal convictions, students entering the program may be subject to a criminal history inquiry. Many agencies require drug testing as well.

Degree Requirements

1st Year Curriculum (full-time):

- SOWK 6101 Human Behavior and the Social Environment I: Individuals, families, and small groups (3)
- SOWK 6111 Social Welfare Policy I: Historical and Policy Context of Social Work Practice (3)
- SOWK 6112 Social Welfare Policy II: Theory, Policy, and Analysis of Social Welfare Policy and Programs in the United States (3)
- SOWK 6121 Social Work Practice I: Theories and skills in practice with individuals, families, groups (3)
- SOWK 6131 Social Work Research I: Introduction to social science research methods (3)
- SOWK 6202 Human Behavior and the Social Environment II: Groups, organizations, communities (3)
- SOWK 6222 Social Work Practice II: Theories and skills in practice with groups and communities (3)
- SOWK 6232 Social Work Research II: Philosophies and methods of evaluating social work practice and programs (3)
- SOWK 6441 Practicum I: Application of foundation knowledge, values, and skills to practice setting (3)
- SOWK 6442 Practicum II: Application of foundation knowledge, values, and skills to practice setting (3)

2nd Year MSW Curriculum (full-time):

- SOWK 7103 Human Behavior and the Social Environment III: Theories of mental illness, DSM- (3)
- SOWK 7123 Advanced Interpersonal Practice with Individuals: Evaluation and intervention methods (3)
- SOWK 7124 Advanced Interpersonal Practice with Families: Diversity among family systems, intervention models (3)

SOWK 7125 Advanced Interpersonal Practice with Small Groups: Group development and facilitation methods (3)

SOWK 7443 Practicum III: Application of advanced knowledge, values, and skills to practice setting (4)

SOWK 7444 Practicum IV: Application of advanced knowledge, values, and skills to practice setting (5)

SOWK 7651 Field of Practice Seminar: Study of theory and practice issues of student's specialty (3)

Two Field of Practice Electives selected according to the student's specialty* (6)

Advanced Standing Curriculum (one full year):

SOWK 6323 Advanced Interpersonal Practice (3)

SOWK 6313 Advanced Social Welfare Policy (3)

SOWK 6232 Research II (3)

SOWK 6343 Advanced Social Work Practicum (3)

Note: Enroll in all of the 2nd Year MSW Curriculum courses listed above.

** Electives may be taken anytime after matriculation into the Program. Electives may be from outside the Department, but must have a social work relevance. At least one elective must relate to the student's Field of Practice Emphasis. The Social Work Department offers different elective topics each year, depending on the expertise of the faculty and student interests. As such, the department cannot guarantee which electives will be offered. Electives must be approved by the student's advisor prior to registration.*

The Field Placement

Field placements are assigned from a variety of agencies and practice settings approved by the UNC Charlotte Social Work Field Office. Field Instructors, approved by the Department, guide the student through learning experiences, coordinating field experiences with the concurrent classroom coursework. The first year of field placement focuses on foundation practice skills. The second year of placement, in a different setting, focuses on advanced practice within the student's Field of Practice Emphasis area. Advanced Standing placements will reflect second year placement goals.

State Certification

Graduates of the MSW Program are eligible to pursue North Carolina State Licensure/Certification at three levels: Licensed Clinical Social Worker, Certified Master Social Worker, and Certified Social Work Manager. Licensure/certification is managed by the North Carolina Certification Board for Social Work. Additional information on The Board may be found online at www.ncswboard.org.

Financial Assistance

Paid internships and assistantships are limited. Contact the department for more information.

COURSES IN SOCIAL WORK

SOWK 6101. Human Behavior and the Social Environment I. (3) Overview of theories related to human behavior with an emphasis on individuals and families, small groups, organizations and communities. Systems theories and theories related to disenfranchised groups including feminist theories are also integrated throughout the course. *(Fall)*

SOWK 6111. Social Welfare Policy I: Historical and Policy Context of Social Work Practice. (3) The development of social work practice theories is presented in the context of the historical evolution of society and specifically social policy. The interaction between social work's professional aspirations, public and private social welfare policy, and the development of practice theories is emphasized. Particular attention is paid to the current trend toward privatization of social welfare services and the effect this is having on social work practice and social workers' career paths and prospects. *(Fall)*

SOWK 6112. Social Welfare Policy II: Theory, Philosophy and Analysis of Social Welfare Policy and Programs in the United States. (3) Prerequisite: SOWK 6111, Social Welfare Policy I; SOWK 6121, Social Work Practice I. This course focuses on the policy making process, policy analysis and implications of policy for program design and service delivery. The course will provide an overview of current policies guiding social work practice in major areas of social welfare service delivery. *(Spring)*

SOWK 6121. Social Work Practice I: Individuals, Families, & Groups. (3) The first course in a two-course foundation practice sequence. Introduces foundation skills and theories of culturally competent social work practice with individuals, families, and groups. Develops the ecological systems perspective of practice with an emphasis on client strengths and problem-solving processes within a context of adherence to social work values and ethics. *(Fall)*

SOWK 6131. Social Work Research I. (3) Prerequisite: An upper division introductory statistics course. First of two courses in the research foundation curriculum. Introduction to social science research methods and their relevance to social work. Preparation to critically read research studies and produce applied research expected in social agencies. *(Fall)*

SOWK 6202. Human Behavior and the Social Environment II. (3) Prerequisite: SOWK 6101, Human Behavior and the Social Environment I. Overview of theories related to human behavior with an emphasis on various theories of small groups, organizations and communities. System theories, social construction theories, and theories related to disenfranchised groups such as feminist theories and non-western, non-English speaking systems of thought are also integrated throughout the course. *(Spring)*

SOWK 6222. Social Work Practice II: Organizations and Communities. (3) Prerequisite: SOWK 6121, Social Work Practice I. The second course in the foundation practice sequence. Introduces foundation skills and theories of culturally competent social work practice with organizations and communities. Areas of focus include leadership development in nonprofit organizations and collaborative approaches to building and strengthening neighborhoods. *(Spring)*

SOWK 6232. Social Work Research II: Practice and Program Evaluation. (3) Prerequisite: SOWK 6131, Social Work Research I. The second course in the foundation research sequence. Introduction to a range of philosophies, methods, and activities involved in evaluation of professional social work practice and of social service programs. Both quantitative and qualitative approaches are explored. *(Spring)*

SOWK 6313. Advanced Social Welfare Policy. (3) Prerequisite: Admission to the Advanced Standing Program. This course introduces the subject area of social welfare policy as a central concern of the social work profession. Policies and programs designed to deal with personal and societal disruptions that result from social and economic changes are presented in historical context. The theory, philosophy, and research basis of current policies in the areas of aging, family and child welfare, health, mental health, and poverty and public welfare are presented. The policy making process, policy analysis, and implications of policy for program design, service delivery, and for social work practice are discussed. *(Summer)*

SOWK 6323. Advanced Interpersonal Practice. (3) Prerequisite: Admission to the Advanced Standing Program. Designed for advanced standing students, this course has an integrated twofold purpose. First, it offers an overview of social work practice with individuals, families, small groups, and organizations and communities that solidifies student understanding of foundation practice theory and methods. Second, it builds upon foundation theory and methods by introducing students to the Program's advanced practice conceptualization of interpersonal practice and the related fields of practice emphases. Students will develop a basic understanding of interpersonal practice with individuals, families, and small groups and how foundation theory and methods can prepare them for the study of interpersonal practice within a selected field of practice emphasis. *(Summer)*

SOWK 6343. Advanced Social Work Practicum and Seminar. (3) Prerequisite: Admission to the Advanced Standing Program. Designed for advanced standing students, this field internship course has an integrated twofold purpose. First, it solidifies student's preparation in foundation social work practice methods and skills with individuals, families, small groups, and organizations and communities. Students will demonstrate their understanding of foundation theories and concepts by

applying practice methods and skills across systems and with diverse clients. They will demonstrate the ability to accurately assess client systems, formulate and carry out plans of intervention, and evaluate the effectiveness of practice. Second, students will develop an emerging understanding of interpersonal practice with individuals, families, and small groups and how foundation practice theories and methods can prepare them for utilizing interpersonal practice methods within a selected field of practice emphasis. *(Summer)*

SOWK 6441. Social Work Practicum I. (3) Prerequisite or Corequisite: SOWK 6121, Social Work Practice I; SOWK 6101, Human Behavior and the Social Environment I. The foundation field practicum prepares students to apply generalist social work knowledge, skills, values, and ethical principles gained in the classroom to actual practice at a social agency. Students work in an approved field site under the supervision of a UNC Charlotte field instructor. *(Fall)*

SOWK 6442. Social Work Practicum II. (3) Continuation of SOWK 6441, Social Work Practicum I & Seminar. *(Spring)*

SOWK 6635. The Social Context of Mental Health. (3) Crosslisted as SOCY 6635, PSYC 8636, and PPOL 8636. Prerequisite: Admission to graduate program or permission of instructor. This course draws upon contributions from the field of psychiatry, psychology, social work, and anthropology. The focus is on mental health and illness in social context, with an emphasis on the relationship between social structure and mental health/disorder. We will examine the social factors which shape psychiatric diagnosis, the effects of socio-demographic variables on mental health, and the role of social support and stress for different groups. The course also examines the organization, delivery, and evaluation of mental health services, and mental health care policy. *(Every other year)*

SOWK 6895. Directed Independent Study. (1-6) Prerequisite: Permission of the department and instructor to be obtained in the semester preceding the semester in which the course is to be taken. Guided individual study in topics related to Social Work that are not offered in the MSW curriculum or available through elective courses in other graduate programs at UNC Charlotte. May be repeated for credit for different topics. *(Fall, Spring, Summer)*

SOWK 7090. Special Topics in Social Work. (3) A topics course that is only available for graduate credit. May be repeated for credit for different topics. *(Fall, Spring, Summer)*

SOWK 7103. Human Behavior and the Social Environment III. (3) Prerequisite: SOWK 6202, Human Behavior and the Social Environment II. Overview of theories related to mental health and mental illness. Content on the responsible use of the Diagnostic and Statistical Manual of the American Psychiatric Association. Social

Construction theories and theories related to deviance and social control will be emphasized. *(Fall)*

SOWK 7123. Advanced Interpersonal Practice with Individuals. (3) Prerequisite: SOWK 6222, Social Work Practice II. As a part of a three-course advanced practice sequence the focus of this course is on multi-theoretical and multi-method approaches for advanced interpersonal practice with individuals. Emphasis is on in-depth assessment, intervention, and evaluation of services with attention to time-limited and empirically supported methodologies. *(Fall)*

SOWK 7124. Advanced Interpersonal Practice with Families. (3) Prerequisite: Social Work 6222, Social Work Practice II. As a part of a three-course advanced practice sequence the focus of this course is on multi-theoretical and multi-method approaches for advanced interpersonal practice with families. Diversity among family systems and time-limited intervention models for social work practice with families are emphasized. *(Spring)*

SOWK 7125. Advanced Social Work Practice with Groups. (3) Prerequisite: SOWK 6222, Social Work Practice II. As a part of a three-course advanced practice sequence the focus of this course is on multi-theoretical and multi-method approaches for advanced interpersonal practice with small groups. Emphasis is on various approaches to group development and facilitation including social change, therapeutic factors, leadership, composition, contracting, goal setting, and evaluation. *(Fall)*

SOWK 7443. Social Work Practicum III. (6) Prerequisite: SOWK 6442, Social Work Practicum II. Corequisite: Enrollment in at least one advanced social work practice class (SOWK 7123, SOWK 7124, or SOWK 7125). Students work in an approved social service agency developing specialized social work skills in their area of focus. Students are expected to demonstrate advanced social work practice skills that indicate an integration of theories, research, and policies in relation to their area of specialization within interpersonal practice. *(Fall)*

SOWK 7444. Social Work Practicum IV. (3) Prerequisite: SOWK 7443, Social Work Practicum III. Corequisite: Enrollment in at least one advanced social work practice class (SOWK 7123, SOWK 7124, or SOWK 7125). Continuation of SOWK 7443, Social Work Practicum III. *(Spring)*

SOWK 7651. Field of Practice Seminar. (3) Prerequisite: Student must be in the last semester of the M.S.W. curriculum. This is a capstone course in which the student prepares a comprehensive paper describing the major historical and current theories, philosophies, and research issues of social work practice, policy, and human behavior in the social environment, related to the field of practice in which the student has indicated a specialization. The student will be expected to present sections of the paper at least twice during the semester. *(Spring)*

SOWK 7627. Seminar in Advanced Practice: Supervision and Staff Training. (3) Prerequisite: Student must be in the last semester of the M.S.W. curriculum. Students may choose to satisfy their social work elective requirement with this course. This seminar is for students who anticipate working in traditional social welfare organizations in the public or private sectors. The focus of this seminar is on knowledge and skills that a social worker will need to succeed in practice in large organizations. Included is content on supervision, staff training and development, and the role of the professional in large organizations. (*Spring*)

SOWK 7999. Master's Degree Graduate Residency
Credit. (1) (*Fall, Spring, Summer*)



College of Liberal Arts and Sciences

www.clas.uncc.edu

Dean: Nancy Gutierrez

Senior Associate Dean: Bill Hill

Associate Dean for Information & Instructional Technology: Dale Pike

Associate Dean for Student Services: Diane Zablotzky

Director of Sponsored Research: Pamela King

The College of Liberal Arts and Sciences is the largest of the seven colleges at The University of North Carolina at Charlotte, housing 17 academic departments and 22 interdisciplinary programs. The College serves the Charlotte region and the state of North Carolina and is engaged in the discovery, dissemination, synthesis and application of knowledge. It provides for the educational, economic, social, and cultural advancement of the people of North Carolina through on-and off-campus programs, continuing personal and professional education opportunities, research and collaborative relationships with the private, public, and nonprofit institutional resources of the greater Charlotte metropolitan region. The College offers a wide array of graduate programming including graduate certificate, Master of Arts, Master of Science, and Ph.D. programs.

Graduate Degree Programs

- Master of Arts in Biology
- Master of Arts in Communication Studies
- Master of Arts in English
- Master of Arts in English Education
- Master of Arts in Ethics and Applied Philosophy
- Master of Arts in Geography
- Master of Arts in Gerontology
- Master of Arts in History
- Master of Arts in Latin American Studies
- Master of Arts in Liberal Studies
- Master of Arts in Mathematics Education
- Master of Arts in Psychology: Clinical/Community
- Master of Arts in Psychology: Industrial / Organizational
- Master of Arts in Religious Studies
- Master of Arts in Sociology
- Master of Arts in Spanish
- Master of Public Administration: Nonprofit Management / Arts Administration / Emergency Management
- Master of Science in Applied Physics
- Master of Science in Biology
- Master of Science in Chemistry
- Master of Science in Criminal Justice
- Master of Science in Earth Sciences
- Master of Science in Mathematics: Applied Mathematics / General Mathematics / Applied Statistics
- Master of Science in Mathematical Finance (*with the Belk College of Business*)
- Master of Science in Optical Science and Engineering
- Ph.D. in Applied Mathematics
- Ph.D. in Biology
- Ph.D. in Geography and Urban Analysis
- Ph.D. in Health Psychology (*with Colleges of Education and Health & Human Services*)
- Ph.D. in Infrastructure and Environmental Systems (*with The William States Lee College of Engineering*)
- Ph.D. in Nanoscale Science
- Ph.D. in Optical Science and Engineering
- Ph.D. in Organizational Science
- Ph.D. in Public Policy

Graduate Non-Degree Programs

- Certificate in Applied Ethics
- Certificate in Cognitive Science
- Certificate in Communication Studies
- Certificate in Emergency Management
- Certificate in Gender, Sexuality, and Women's Studies
- Certificate in Gerontology
- Certificate in Non-Profit Management
- Certificate in Technical/Professional Writing
- Certificate in Translating and Translation Studies

Biology

- **Ph.D. in Biology**
- **M.S. in Biology**
- **M.A. in Biology**

Department of Biology

257 Woodward
704-687-8686
www.bioweb.uncc.edu

Program Coordinator

Dr. Cy Knoblauch

Graduate Faculty

Lawrence Barden, Professor
Rob Bierregaard, Research Professor
Kenneth Bost, Professor
Mark Clemens, Professor
Didier Dréau, Assistant Professor
Julie Goodliffe, Assistant Professor
Valery Grdzlishvili, Assistant Professor
Michael Hudson, Professor
Yvette Huet, Professor
Lawrence Leamy, Professor
Ian Marriott, Professor
Pinku Mukherjee, Professor
Daniel Nelson, Research Associate Professor
James Oliver, Professor
Matthew Parrow, Assistant Professor
Susan Peters, Associate Professor
Ken Piller, Research Associate Professor
Thomas Reynolds, Professor
Christine Richardson, Associate Professor
Amy Ringwood, Assistant Professor
Stanley Schneider, Professor
Laura Schrum, Associate Professor
Inna Sokolova, Associate Professor
Todd Steck, Associate Professor
Christopher Yengo, Assistant Professor
Jian Zhang, Associate Professor

INTERDISCIPLINARY PH.D. IN BIOLOGY (Biomedical Science and Biotechnology)

The Interdisciplinary Ph.D. in Biology Program has as its intellectual focus a synthesis of the molecular and integrative bases of biomedical sciences and related biotechnology. In addition to a vigorous research concentration, the program emphasizes the importance of relevant course work. All students are required to complete a series of core courses that stress the interdisciplinary nature of the program. The cornerstone of the program is the student's research dissertation. Each dissertation is expected to be a significant scientific contribution based on independent and original research, leading to publications in national/international peer-reviewed journals.

For further information, please see our regularly updated website at www.bioweb.uncc.edu/doctoral.

Additional Admission Requirements

Applicants will be evaluated in a holistic manner to identify those who have the greatest potential for success. In addition to the general requirements for admission to the Graduate School, to begin study toward the Interdisciplinary Ph.D. in Biology, students admitted to the program should have:

- 1) A B.S. or B.A. degree from an accredited university.
- 2) An overall grade point average of at least 3.0 out of 4.0. Additionally, applicants must have a grade point average of at least 3.5 in biology, 3.0 in chemistry, and 3.0 in mathematics.
- 3) A score on the Graduate Record Examination General Test in at least the 65th percentile (average for the verbal, quantitative, and analytical sections).
- 4) A minimum of 24 hours in biology, including at least one course in genetics, physiology, and cell/molecular biology. Additionally, applicants should have one year each of general chemistry, organic chemistry, physics, and mathematics. Applicants with academic deficiencies may be admitted on the condition that any deficiencies are corrected during the first year of graduate study. The Interdisciplinary Ph.D. Committee will determine the remediation necessary for identified deficiencies.
- 5) A score of at least 83 on the Internet-based and 220 on the computer-based Test of English as a Foreign Language (TOEFL) for applicants whose native language is not English. Students who do not pass this examination must pass ENGL 1100 (English as a Foreign Language) with a grade of C or higher. In addition, these students who will be involved in any instructional activity (e.g., teaching assistants) will be required to be evaluated by the English Language Training Institute at UNC Charlotte prior to the beginning of the first semester of study.

- 6) Three letters of reference, at least two of which must be from faculty members.

Degree Requirements

The Ph.D. acknowledges the value of course work as background and preparatory for research, but the primary emphasis of the program is on the development of research skills and the completion of a research project on a significant problem in the area of biomedicine or biotechnology.

1.) Total hours required.

The program requires 72 post-baccalaureate credit hours. All students are required to take a general curriculum that includes a sequence of required courses as shown below.

Required Courses (suggested year 1): 8 semester hours. Two team-taught semester-long courses. All students must take Principles of Biochemistry (Fall, 4 credits), and Molecular and Cell Biology (Fall, 4 credits). These courses will provide the fundamental background for the applied focus of the program.

Required Courses (suggested year 2): 6 semester hours. Four team-taught semester-long courses in Bioethics (Fall, 3 credit) and Hypothesis Testing (Fall, 3 credits). These courses will build on the material presented in Core A and will emphasize the chemistry, physics, and engineering principles as they impact biomedicine and biotechnology.

Years 1-4:

Interdisciplinary Colloquium; 4 semester hours (1 hour per year). This course brings together faculty and students from the participating programs in an informal discussion of interdisciplinary research. (Fall semester only).

Years 1-4:

Seminar; 4 semester hours (1 hour per year). Formal student presentations of current literature topics in their area of study. (Spring semester only).

Years 1 & 2:

Laboratory Research Rotations; a minimum of 2 and a maximum of 6 semester hours total (1-3 rotations of 2 hours each). These hours will be earned in Year 1 and completed by the beginning of Year 2.

Years 2 & 3:

Electives; 18 semester hours minimum; at least half of the credits must be from 8000-level courses. Advanced topics courses to be selected by students in consultation with their dissertation committee. These will be specialty topics in the areas of expertise of program faculty.

2.) Proportion of courses open only to graduate students.

All the basic core courses, interdisciplinary colloquium, and seminar classes are open to graduate students only. Lab rotations are restricted to doctoral students. At least half of the minimum 18 hours of electives must be in courses at the

8000 level or higher. The remaining credit hours can be completed in any Dissertation Committee-approved graduate level courses.

3.) Grades required.

A student must maintain a cumulative average of 3.0 in all course work taken for graduate credit. Lab rotations and the dissertation research will be graded on a Pass/Unsatisfactory basis and therefore will not be included in the cumulative average. An accumulation of two C grades will result in termination of the student's enrollment in the graduate program. If a student makes a grade of U in any course, enrollment in the program will be terminated.

4.) Amount of transfer credit accepted.

Only courses with grades of A or B may be accepted for transfer credit. Although the maximum amount of credit past the baccalaureate degree that a Ph.D. student may count towards the doctorate is 30 semester hours, only courses appropriate for the program and curriculum in which the student is enrolled may be transferred. This should be determined by the student's Dissertation Committee and approved by the program coordinator, before the request is submitted to the Graduate School. This rule applies whether the courses were taken at UNC Charlotte or elsewhere, and whether a master's degree was earned or not. However, no more than six hours taken when the student was in post-baccalaureate (non-degree seeking) status may be applied toward the doctoral degree.

5.) Departmental seminars.

Graduate students are expected to attend all seminars sponsored by the Department of Biology. In addition, each student is required to make a 20 min presentation on his/her research at the departmental seminar after entering his/her 2nd year in the program. The Ph.D. coordinator will work out the logistics with the department seminar coordinator concerning the arrangement of students' presentations.

6.) Advancement to candidacy.

For Advancement to Candidacy, a student must complete the following by the end of the 5th semester of study. First, the student must pass the Candidacy Examination. A dissertation topic will then be proposed to the student's Dissertation Committee. A student advances to candidacy following approval of the proposed dissertation topic by the student's Dissertation Committee and the Dean of the Graduate School.

7.) Dissertation.

The doctoral program of study must include a minimum of 18 hours of dissertation credit. The student must complete and defend a dissertation based on a research program approved by the student's dissertation committee which results in a high quality, original and substantial piece of research. The student must orally present and successfully defend the dissertation to the student's dissertation committee in a defense that is open to the public. A copy of the dissertation must be made available for review by the

program doctoral faculty at least two weeks prior to the public defense.

A paper reporting results described in the dissertation shall be included in the dissertation (e.g., in an appendix). The paper may be published, accepted for publication, submitted for publication, or a draft following the guidelines of a journal to which the results will be submitted.

8.) UNC Charlotte residency requirement.

The student must satisfy the UNC Charlotte residency requirement for the program by completing 20 hours, either as course work or research credits. Residence is considered to be continuous if the student is enrolled in one or more courses in successive semesters until 20 hours are earned.

9.) Laboratory research rotations.

Laboratory research rotations allow the student to sample areas of research and become familiar with program faculty. A student will engage in a minimum of 1 rotation with a maximum of 3 rotations. Each rotation will consist of a minimum of 4 weeks and there is no expectation that the work done during the rotation will result in a publication. By the end of the student's second semester he/she must have determined their major advisor. A rotation must have been completed in the advisor's laboratory.

The purpose of a laboratory rotation is to learn and perform techniques associated with the lab, and to potentially identify a Dissertation Advisor. A typical rotation will involve 5-10 hours per week in the laboratory for 4-10 weeks. Students are encouraged to identify a sponsoring faculty member well in advance of the scheduled rotation. Students must meet with the sponsoring faculty member to determine what will be done during the rotation, i.e. techniques to be learned and identification of the project to be completed. At the end of the rotation the student must write a one- to two-page synopsis of the rotation to be signed by the sponsoring faculty member and turned in to the Ph.D. coordinator.

10.) Teaching.

Every student must teach at least once. This requirement is satisfied by being a Teaching Assistant for one course.

11.) Deadlines.

- A student must establish their graduate committee by the end of the 3rd Semester
- The student and graduate committee must meet by the end of the 4th Semester to set timeline for candidacy exam.
- The student is required to meet with their graduate committee at least once a year
- The deadline for completing the candidacy exam is the end of the student's 5th Semester.

12.) Time limits for completion.

All requirements for the degree must be completed within eight years after first registration as a doctoral student. The

student must achieve admission to candidacy within six years after admission to the program and complete all requirements within six years after admission to candidacy for the Ph.D. degree. These time limits are maximums; students will typically be expected to complete the degree requirements within five years.

MASTER OF SCIENCE IN BIOLOGY

The Master of Science degree program is designed for students who desire to pursue advanced studies in professional and graduate schools or various vocational opportunities in biology and related areas (see www.bioweb.uncc.edu/masters). The program provides the opportunity for broad training in a variety of biological areas as well as specialization in areas of particular interest to the student. The department has two areas of research strength: Biomedical/ Biotechnology, and Ecology/Environmental. Students also have the opportunity to conduct their thesis research under the direction of select faculty at the Carolinas Medical Center in Charlotte.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following requirements are specific to the Department of Biology:

- A B.S. or B.A. degree from an accredited university.
- Evidence of undergraduate preparation in biology with a minimum 24 semester hours in biology and 24 semester hours of cognate study.
- An overall grade point average of at least 3.0 out of 4.0. Additionally, applicants must have a grade point average of at least 3.0 in biology.
- A score on the Graduate Record Examination General Test in at least the 50th percentile (average for the verbal, quantitative, and analytical writing sections).
- A score of at least 83 on the Internet-based and 220 on the computer-based Test of English as a Foreign Language (TOEFL) for applicants whose native language is not English. Students who do not pass this examination must pass ENGL 1100 (English as a Foreign Language) with a grade of C or higher. In addition, these students who will be involved in any instructional activity (e.g., teaching assistants) will be required to be evaluated by the English Language Training Institute at UNC Charlotte prior to the beginning of the first semester of study.
- Three letters of reference, at least two of which must be from faculty members.

Degree Requirements

1.) **Total hours required.** The program leading to the Master of Science degree in Biology requires the successful completion of 30 semester hours of course work approved by a supervisory committee.

In addition to course work, each degree candidate must pass an oral candidacy examination.

2.) **Proportion of courses open only to graduate students.** At least 16 of the 30 required hours, including no more than eight hours of thesis research, must be in courses open to graduate students only.

3.) **Grades required.** A student must maintain a cumulative average of 3.0 in all course work taken for graduate credit. An accumulation of more than two C grades will result in termination of the student's enrollment in the Master's program. If a student makes a grade of U in any course, enrollment in the program will be terminated.

4.) **Amount of transfer credit accepted.** Up to 6 hours of transfer credit may be applied to the Master's degree. Only courses with grades of A or B may be accepted for transfer credit. Courses taken to satisfy the requirements of a previously completed degree can not be counted toward the Master's degree. All transfer credit must be approved by the student's Thesis Committee and the Graduate Coordinator.

5.) **Equipment Use workshop.** Each student must complete a "Departmental Equipment Use Workshop" to satisfy the requirements for graduation. This single-afternoon workshop is offered every year and provides an overview of the proper use of equipment available to all graduate students.

6.) **Departmental seminars.** Graduate students are expected to attend all seminars sponsored by the Department of Biology.

7.) **Thesis.** The candidate must prepare a thesis based upon original research acceptable to the Supervisory Committee and the Dean of the Graduate School. The student must orally present and successfully defend the thesis to the student's supervisory committee in a defense that is open to the public.

8.) **Teaching.** Every student is required to be a teaching assistant for at least one class in one semester.

Admission to Candidacy

General academic regulations will apply to application for admission to candidacy. In addition to these the applicant should have:

- 1) Removed any identified entrance deficiencies by the time of application.
- 2) Successfully completed the candidacy examination.
- 3) Taken at least 15 hours of graduate work with a GPA of 3.0 or better.
- 4) Satisfied the supervisory committee that he/she is qualified to become a candidate, i.e., can fulfill the requirements successfully.

Assistantships

Teaching and research assistantships are available on a competitive basis for qualified students. A limited number

of out-of-state and in-state tuition grants are also competitively awarded.

MASTER OF ARTS IN BIOLOGY

The Master of Arts degree program is designed for students who choose to write a thesis based upon published scientific literature rather than on laboratory or field research (see www.bioweb.uncc.edu/Masters).

Degree Requirements

Students who choose to pursue the Master of Arts degree must complete the requirements for the Master of Science degree with the following exceptions: at least 32 hours of course work. A maximum of four hours of credit for thesis research may be included in the required 32 hours, and three courses of the 32 hours submitted for the degree must include a formal laboratory.

COURSES IN BIOLOGY

Master's Level

BIOL 5000. Advanced Topics in Biology. (1-4) Courses in selected topics and advanced studies in biology. Lecture and laboratory hours will vary with the topics taught. May be repeated for credit as topics vary. (*Fall, Spring*)

BIOL 5111. Evolution. (3) Theories of evolution and forces which affect gene frequencies. (*Fall*)

BIOL 5121. Biometry. (4) Prerequisite: one course in statistics. Design and analysis of experiments. Three lecture hours and one laboratory period of three hours a week. (*Spring*)

BIOL 5144. Advanced Ecology. (4) Energy flow, nutrient cycles, community structure, population growth and regulation. Three lecture hours and one laboratory period of three hours a week. (*Fall*)

BIOL 5162. Environmental Biotechnology I. (3) Prerequisite: a grade of C or better in BIOL 3161 or BIOL 3199. Applications of biotechnology to solve real-world environmental civil-engineering problems working in interdisciplinary teams. Three lecture hours per week. (*Fall*)

BIOL 5163. Environmental Biotechnology II. (3) Prerequisite: a grade of C or better in BIOL 3161 or BIOL 3199 and permission of instructor. Applying biotechnology in the laboratory to solve real-world environmental civil-engineering problems working in teams. One laboratory period and two lecture hours per week. (*Spring*)

BIOL 5168. Recombinant DNA Techniques. (3) Modern molecular biological methods (such as DNA cloning, gel electrophoresis, nucleic acid hybridization, PCR, and DNA

sequencing) data analysis and interpretation. One lecture hour and two laboratory periods of three hours a week. *(Fall)*

BIOL 5171. Cell Physiology. (3) The fundamental physicochemical properties of cells. *(Fall)*

BIOL 5184. Plant Biotechnology. (3) A laboratory-oriented course designed to integrate plant molecular biology, recombinant DNA technology, and plant cell and tissue culture. One lecture hour and two laboratory periods of three hours a week. *(Spring) (Alternate years)*

BIOL 5189. Mechanisms in Development. (3) Cellular and molecular bases of differentiation; an exploration of the experimental analysis of causal and controlling factors in development. *(Spring)*

BIOL 5199. Molecular Biology. (3) Structural and functional interaction of nucleic acids and proteins in the replication, transcription and translation of genetic material. *(Fall)*

BIOL 5205. Advanced Horticulture. (3) Topics in ornamental horticulture and landscaping, including greenhouse projects and field trips. Two lecture hours and three hours of lab a week. *(Spring)*

BIOL 5221. Plant Systematics. (4) Identification and classification of vascular plants, including experimental concepts of speciation. Three lecture hours and one laboratory period of three hours a week. *(Spring)*

BIOL 5223. The Fungi. (3) Morphology, life cycles, ecology, taxonomy, and medical economic significance of the fungi and organisms historically aligned with the fungi. *(On demand)*

BIOL 5223L. The Fungi Laboratory. (1) Corequisite/prerequisite: BIOL 5223; Permission of department for graduate credit. One laboratory period of three hours a week. *(On demand)*

BIOL 5229. Dendrology. (4) The identification, structure, function, ecology, reproduction, and evolutionary relationships of woody plants. Three lecture hours and one three-hour lab a week. *(Fall)*

BIOL 5233. Parasitology. (3) Prerequisites: BIOL 2130. Morphology, life cycles, ecology, taxonomy, and medical and economic importance of parasites. Three lecture hours a week. *(On demand)*

BIOL 5233L. Parasitology Laboratory. (1) Prerequisite or corequisite: BIOL 5233. One laboratory period of three hours a week. *(On demand)*

BIOL 5234. Wildlife Biology. (3) Concepts, principles and techniques of wildlife biology. Identification and life histories with emphasis on the value, study attraction,

management, conservation and control of wildlife species. *(On demand)*

BIOL 5234L. Wildlife Biology Laboratory. (1) Prerequisite or corequisite: BIOL 5234. One laboratory period of three hours a week plus field trips. *(On demand)*

BIOL 5235. Mammalogy. (4) Taxonomy, anatomy, physiology and life histories of the mammals. Three lecture hours and one laboratory period of three hours a week. *(Fall)*

BIOL 5242. The Biology of Birds. (3) Prerequisite: BIOL 3144 or permission of department. Overview of general avian biology, including taxonomy and anatomy, but concentrating on behavior, ecology and conservation of birds. Focus will be on birds of the southeastern U.S. *(Spring)*

BIOL 5242L. The Biology of Birds Lab. (1) Meets for one three-hour period per week. The laboratory and field portion of the Biology of Birds will focus on field identification and inventory techniques, with an introduction to anatomy. Students will need binoculars. *(Spring)*

BIOL 5243. Animal Behavior. (3) An ethological approach to how animals respond to their environment. Causation, development and adaptive significance of behavior in social systems. *(Fall)*

BIOL 5243L. Animal Behavior Laboratory. (1) Prerequisite or corequisite: BIOL 5243. One laboratory period of three hours a week. *(Fall)*

BIOL 5244. Conservation Biology. (3) Conservation values, extinction rates, genetic diversity, demography, habitat fragmentation, reserve management, ecological restoration. *(Yearly)*

BIOL 5244L. Conservation Biology Laboratory. (1) Prerequisite or corequisite: BIOL 5244. One laboratory period of three hours a week plus field trips. *(Yearly)*

BIOL 5250. Microbiology. (3) Morphology, physiology, pathogenicity, metabolism and ecology of micro-organisms. *(Spring, Fall)*

BIOL 5250L. Microbiology Laboratory. (1) Prerequisite or corequisite: BIOL 5250. One laboratory period of three hours a week. *(Spring, Fall)*

BIOL 5251. Immunology. (3) Cellular, molecular and genetic basis for immunity; physical chemistry of antigens and antibodies and their interactions; defense mechanisms. *(Spring, Summer)*

BIOL 5251L. Immunology Laboratory. (1) Prerequisite or corequisite: BIOL 5251. One laboratory period of three hours a week. *(Spring)*

BIOL 5253. Marine Microbiology. (4) Bacteria, fungi and viruses of marine origin, and their response to the salt, temperature, pressure and nutrient environment of the ocean. Roles of marine microorganisms in public health, pollution and fouling. Three lecture hours and one laboratory period of three hours a week. *(Spring)*

BIOL 5254. Epidemiology. (3) History and practices of epidemiology with emphasis on modes of transmission of clinically important infectious agents and the analysis of epidemiological data. Three lecture hours a week. *(On demand)*

BIOL 5255. Bacterial Genetics. (3) Regulation of gene expression in bacterial systems. Bacteriophage genetics. DNA transfer in bacteria. *(Spring)*

BIOL 5256. Pathogenic Bacteriology. (3) Cellular and molecular interactions of mammalian hosts with procaryotic parasites. *(Fall)*

BIOL 5256L. Pathogenic Bacteriology Laboratory. (1) One laboratory period of three hours a week. *(Fall)*

BIOL 5257. Microbial Physiology and Metabolism. (3) Bacterial cell growth and division, transport mechanisms, catabolism and energy production, biosynthesis of cellular components, global regulation of gene expression in response to the environment, and cell-cell communication between bacteria. *(Spring)*

BIOL 5257L. Microbial Physiology and Metabolism Lab. (1). Laboratory experiments on such topics in general microbiology as the preparation and use of cell-free systems, isolation of auxotrophs, transport mechanisms, radiolabelling and separation of proteins, etc. *(Spring)*

BIOL 5259. Virology. (3) Morphology, classification, genetics and pathogenicity of bacterial and animal viruses. *(Fall)*

BIOL 5259L. Virology Laboratory. (1) Prerequisite or corequisite: BIOL 5259. One laboratory period of three hours per week. *(Fall)*

BIOL 5260. Population Genetics (3) The genetics of qualitative and quantitative traits in populations, including an assessment of the factors affecting the extent and pattern of the genetic variation in these traits. *(On demand)*

BIOL 5277. Endocrinology. (3) Endocrine glands and their physiological roles in metabolism, growth and reproduction. *(On demand)*

BIOL 5277L. Endocrinology Laboratory. (1) Prerequisite or corequisite: BIOL 5277. One laboratory period of three hours a week. *(On demand)*

BIOL 5279. Neurobiology. (3) Physiology and anatomy of nervous systems, especially mammalian. *(Spring)*

BIOL 5279L. Neurobiology Laboratory. (1) Prerequisite or corequisite: BIOL 5279. One laboratory period of three hours a week. *(Spring)*

BIOL 5282. Developmental Plant Anatomy. (3) Study of plant cells, tissues, organs and patterns of growth and differentiation. *(Spring)*

BIOL 5282L. Developmental Plant Anatomy Laboratory. (1) Prerequisite or corequisite: BIOL 5282. One laboratory period of three hours a week. *(Spring)*

BIOL 5283. Animal Development. (3) Developmental processes occurring chiefly during gametogenesis, fertilization, early embryogenesis and organogenesis. *(Fall)*

BIOL 5283L. Animal Development Laboratory. (1) Prerequisite or corequisite: BIOL 5283. One laboratory period of three hours a week. *(Fall)*

BIOL 5291. Histology. (4) Animal tissues and organs; techniques of preparing tissues for analysis. Three lecture hours and one laboratory period of three hours a week. *(Spring)*

BIOL 5292. Advances in Immunology. (3) Current topics in immunology with particular emphasis upon the genetic systems and molecular mechanisms underlying immune reactions. *(Fall)*

BIOL 5293. Comparative Vertebrate Anatomy. (4) Prerequisite: BIOL 2111. Comparative studies of the anatomy, physiology and functional adaptations of selected vertebrates with emphasis on evolutionary developments, especially in mammals. Three lecture hours and one laboratory period of three hours a week. *(Spring)*

BIOL 6000. Special Topics in Biology. (1-4) Prerequisite: permission of department. Courses in selected topics and advanced studies in biology. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. *(On demand)*

BIOL 6010. Special Topics in Microbiology. (1-4) Prerequisite: permission of department. Advanced courses in microbiology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. *(On demand)*

BIOL 6020. Special Topics in Systematic Biology. (1-4) Prerequisite: permission of department. Advanced courses in systematic and evolutionary biology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. *(On demand)*

BIOL 6030. Special Topics in Genetics. (1-4) Prerequisite: permission of department. Advanced courses in genetics. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. (*On demand*)

BIOL 6040. Special Topics in Molecular Biology. (1-4) Prerequisite: permission of department. Advanced courses in biochemistry and molecular biology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. (*On demand*)

BIOL 6050. Special Topics in Physiology. (1-4) Prerequisite: permission of department. Advanced courses in physiology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. (*On demand*)

BIOL 6060. Special Topics in Developmental Biology. (1-4) Prerequisite: permission of department. Advanced courses in developmental biology and embryology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. (*On demand*)

BIOL 6070. Special Topics in Anatomy. (1-4) Prerequisite: permission of department. Advanced courses in anatomy and morphology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. (*On demand*)

BIOL 6080. Special Topics in Behavior. (1-4) Prerequisite: permission of department. Advanced courses in behavior. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. (*On demand*)

BIOL 6090. Special Topics in Ecology. (1-4) Prerequisite: permission of department. Advanced courses in ecology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. (*On demand*)

BIOL 6102. Cell and Molecular Biology. (4) Prerequisites: CHEM 6101, or permission of instructor. Structure of cellular components; the cell cycle; regulation of transcription, translation, and protein trafficking; cell membranes and transport; cell-cell communication, including signal transduction; extracellular matrix. Thirty two-hour lectures. (*Fall*)

BIOL 6103. Microbiology and Immunology. (4) Prerequisites: CHEM 6101 and BIOL 6102, or permission of instructor. Function and pathogenesis of prokaryotes, as well as related aspects of host response. Microbial physiology with an emphasis on aspects relevant to pathogenesis; bacterial genetics with an emphasis on operons and regulons as model of control of bacterial gene expression; pathogenic microbiology with an emphasis on

invasion and intracellular survival; immunology with an emphasis on the role of the immune response in resistance to infection. Thirty two-hour lectures. (*Spring*)

BIOL 6104. Integrative Systems Physiology. (4) Prerequisites: CHEM 6101, BIOL 6102, BIOL 6103, or permission of instructor. The functioning of an intact mammalian organism with an emphasis on human physiology. Traditional survey of organ systems' functions, and problems of the response of cells within tissues to stress and their impact on organismal response. Thirty two-hour lectures. (*Spring*)

BIOL 6273. Advanced Human Physiology. (3) Prerequisite: admission to MSN program. Advanced course in human physiology stressing the interaction between physiological systems. (*Fall, Spring*)

BIOL 6274. Advanced Human Pathophysiology. (3) Prerequisite: admission to MSN program. Advanced course in human pathophysiology stressing the loss of normal function interaction in physiological systems. (*Spring*)

BIOL 6600. Seminar. (1-2) Topics of current emphasis in biology. May be repeated for credit. (*Fall, Spring*)

BIOL 6800. Tutorial. (1-4) Directed study in areas of specialization in biology and related fields. Maximum credit toward degree: four hours. Offered on a Pass/Unsatisfactory or IP basis only. (*Fall, Spring*)

BIOL 6900. Research and Thesis. (1-8) IP grade until the student's last semester and then changed to Pass/Unsatisfactory grading. (*Fall, Spring*)

BIOL 7999. Master's Degree Graduate Residency Credit. (1)

Doctorate Level

<p>BIOL 8000. Special Topics in Biology. (1-4) Prerequisite: permission of department. Courses in selected topics and advanced studies in biology. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. (<i>On demand</i>)</p>
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<p>BIOL 8010. Special Topics in Microbiology. (1-4) Prerequisite: permission of department. Advanced courses in microbiology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. (<i>On demand</i>)</p>
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<p>BIOL 8030. Special Topics in Genetics. (1-4) Prerequisite: permission of department. Advanced courses in genetics. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. (<i>On demand</i>)</p>
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<p>BIOL 8040. Special Topics in Molecular Biology. (1-4) Prerequisite: permission of department. Advanced courses in</p>

biochemistry and molecular biology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. (*On demand*)

BIOL 8050. Special Topics in Physiology. (1-4)
Prerequisite: permission of department. Advanced courses in physiology. May be repeated for credit as topics vary. Lecture and laboratory hours will vary with the courses taught. May be repeated for credit. (*On demand*)

BIOL 8102. Cell and Molecular Biology. (4) Prerequisite: Admission to PhD program or permission of department. Structure of cellular components; the cell cycle; regulation of transcription, translation, and protein trafficking; cell membranes and transport; cell-cell communication, including signal transduction; extracellular matrix. Thirty two-hour lectures. (*Fall*)

BIOL 8103. Microbiology and Immunology. (4)
Prerequisites: CHEM 8101 and BIOL 8102, or permission of instructor. Function and pathogenesis of prokaryotes, as well as related aspects of host response. Microbial physiology with an emphasis on aspects relevant to pathogenesis; bacterial genetics with an emphasis on operons and regulons as model of control of bacterial gene expression; pathogenic microbiology with an emphasis on invasion and intracellular survival; immunology with an emphasis on the role of the immune response in resistance to infection. Thirty two-hour lectures. (*Spring*)

BIOL 8104. Integrative Systems Physiology. (4)
Prerequisites: CHEM 8101, BIOL 8102, BIOL 8103, or permission of instructor. The functioning of an intact mammalian organism with an emphasis on human physiology. Traditional survey of organ systems' functions, and problems of the response of cells within tissues to stress and their impact on organismal response. Thirty two-hour lectures. (*Spring*)

BIOL 8200. Interdisciplinary Colloquium. (1)
Prerequisites: Admission to the Interdisciplinary Ph.D. in Biology Program. Discussion and analysis of topics of current emphasis in biomedicine and biotechnology. May be repeated for credit. (*Fall*)

BIOL 8201. Seminar. (1) Prerequisites: Admission to the Interdisciplinary Ph.D. in Biology Program. Formal student presentations of current literature topics. May be repeated for credit. (*Spring*)

BIOL 8800. Laboratory Rotations. (2) Prerequisites: Admission to the Interdisciplinary Ph.D. in Biology Program. Directed study in an area of specialization. May be repeated for credit. Offered on a *Pass/Unsatisfactory* basis only. (*Fall, Spring, Summer*)

BIOL 8999. Doctoral Dissertation Research. (0-9)
Prerequisites: Admission to the Interdisciplinary Ph.D. in Biology Program. Individual investigation that culminates

in the preparation and presentation of a doctoral dissertation. May be repeated for credit. Offered on a *Pass/Unsatisfactory* or *IP* basis only. (*Fall, Spring, Summer*)

BIOL 9999. Doctoral Degree Graduate Residency Credit. (1)

Related Courses

<p>CHEM 8101. Biochemical Principles. (4) Prerequisites: Admission to Ph.D. program. Molecular biophysics of biological molecules. Bioenergetics of biological reactions and enzyme structure, mechanisms, and regulation. Metabolic pathways and the role of cellular organelles. Biochemical analysis methodology. Thirty-one two-hour lectures. (<i>Fall</i>)</p>

<p>CHEM 8165. Advanced Biochemistry. (3) Prerequisites: CHEM 8101, BIOL 8102, 8103, 8104. Advanced course on protein structure, enzyme and mechanistic biochemistry, metabolic biochemistry, biophysical chemistry. Three lecture hours per week. (<i>Spring</i>)</p>
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<p>MEGR 8109. Biotechnology and Bioengineering. (3) Prerequisite: Admission to a graduate program or permission of instructor(s). This interdisciplinary course discusses key issues in device design, and heat and mass transport with cell biology, molecular biology, and physiology to introduce students to technological innovations in biotechnology and bioengineering. (<i>Spring, Alternate years</i>)</p>

<p>PHIL 8050. Biomedical Ethics. This course will focus on the ethical issues that relate to both biomedical science and biotechnology. Topics will include medical research ethics, ethics of organ "making" and organ transplantation, alternative and complementary medicine, and a heavy emphasis on genetic screening, genetic counseling, gene therapy, cloning, and stem-cell research.</p>

<p>PHYS 8101. Biophysics. (3) Prerequisite: Permission of instructor. Will include principles of physics relevant to biological media; electrical activity, optical microscopy, and spectrophotometry. Photosynthesis and light absorption. Models of blood flow and the cardiovascular system. Dynamics of membrane lipids and ionic flow. Visual and audio systems. Radiation biophysics, ultrasonic interaction in biological media. (<i>Fall</i>)</p>
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Chemistry

- **M.S. in Chemistry**
- **Ph.D. in Nanoscale Science** (*see individual Nanoscale Science section*)

Department of Chemistry

200 Burson
704-687-4765
www.chemistry.uncc.edu/ms-program.html

Master's Program Coordinator

Dr. Brian T. Cooper

Graduate Faculty

Banita W. Brown, Associate Professor
Brian T. Cooper, Associate Professor
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Thomas D. DuBois, Charles H. Stone Professor of Chemistry
Markus Etzkorn, Assistant Professor
Kenneth E. Gonsalves, Celanese Acetate Distinguished Professor of Polymer Chemistry
Daniel S. Jones, Associate Professor
Joanna K. Krueger, Associate Professor
Sherine O. Obare, Assistant Professor
Craig A. Ogle, Professor
Jordan C. Poler, Associate Professor
Daniel Rabinovich, Professor
John M. Risley, Professor
Thomas A. Schmedake, Associate Professor

MASTER OF SCIENCE IN CHEMISTRY

The Chemistry Department offers a research-based Master of Science (M.S.) degree, which provides the background necessary for further graduate or professional studies in the physical, life or medical sciences or a career in chemistry. The M.S. degree requires a minimum of 30 credit hours and a thesis based on original research carried out under the direction of a member of the graduate faculty. Student participation in research activities is through selection of a faculty advisor and enrollment in the special research courses offered. Major emphasis is placed upon the research project and required thesis. UNC Charlotte B.S. degree chemistry majors may elect to participate in the five-year Accelerated Early Entry M.S. program (described in the *UNC Charlotte Undergraduate Catalog*).

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Chemistry:

- 1) A satisfactory score on the Graduate Record Examination.

- 2) Administration of placement examinations by the department each semester just prior to registration as an aid in identifying academic deficiencies.
- 3) Removal of any deficiencies within one year.
- 4) International students must meet published University standards on English proficiency.

Degree Requirements

The candidate for the degree must present a minimum of 30 semester hours including at least 15 semester hours in 6000-level courses open to graduate students only. Required courses may include CHEM 3141, 3142, 5111, 5121, 5133, 5134 5135 or 5165. Two semester hours of graduate seminar, CHEM 6681 and CHEM 6682, and at least one, but up to 16 semester hours of research and thesis credit, CHEM 6900, must be taken. In addition, six semester hours from the course group CHEM 6060, 6069, 6082, 6101, 6115, 6125, 6126, 6135, 6138, 6145, 6146, 6147, 6155, 6165, or MEGR 6109 or another course that has been approved by the Chemistry faculty, are required. Departmental approval is necessary before CHEM 6060 credit can be used to satisfy this requirement. Any 5000 level or higher Biology, Engineering, Mathematics or Physics course, except those designed for a professional education sequence, may be taken for graduate credit upon departmental approval. Well-prepared students, particularly those with degrees from ACS-approved programs, will normally satisfy the requirement for CHEM 3141, 3142, 5111, 5121, 5133, 5134, 5135 or 5165 through placement examinations administered after admission. In those cases, hours that would have been earned for these courses may be replaced by research, CHEM 6900, or by elective courses. A grade point average of 3.0 is required for the degree. An accumulation of two marginal (C) grades or one unsatisfactory (U) grade on the graduate transcript will result in termination of the student's enrollment in the M.S. Program and a termination of any assistantships and fellowships they were receiving.

A student in the chemistry M.S. program is required to maintain satisfactory progress toward the degree. Continued enrollment is at all times subject to review on the basis of academic record. This review is performed by the departmental Graduate Committee.

Admission to Candidacy

An Admission to Candidacy form must be submitted approximately one month prior to the beginning of the semester in which the graduate student expects to complete all requisites for the M.S. degree.

Assistantships

Graduate students generally support their education through teaching or research assistantships available through the Chemistry Department. The department also sponsors the Gary Howard Research Fellowship competition, which provides significantly greater support to one highly qualified applicant. Tuition waivers are also available to external applicants through the Thomas Walsh Tuition Fellowships. Many faculty may offer research assistantships to qualified

students Further information is available in the Department. Support in the summer months is also available.

Electives

Any 5000 level or higher Biology, Engineering, Mathematics or Physics course, except those designed for a professional education sequence, may be taken for graduate credit upon departmental approval.

Advising

Approval of the program of each student and monitoring his/her progress toward the degree is the responsibility of the student's research advisor. Prior to the selection of a research advisor, graduate student progress is monitored by the departmental Graduate Committee.

Thesis

A thesis must be written and defended within six calendar years after admission into the M.S. program as a degree student.

Thesis Committee

The written thesis is defended before the department and a special thesis committee of no fewer than four persons, with at least one member from outside of the Chemistry Department.

Application for Degree

Each student should make application for his/her degree by completing the on-line Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

Research Experiences

Chemistry faculty offer research opportunities in all areas of molecular and nanoscale sciences, and many participate in formal or informal interdisciplinary research programs. Faculty research interests include computational chemistry, organic synthesis, polymer chemistry, organometallic chemistry, structural and mechanistic organic chemistry, electrochemistry, materials and interfacial chemistry, catalysis, biochemistry, biophysical chemistry, analytical separations, bioanalytical chemistry, mass spectrometry, and chemical education. Many chemistry faculty are active participants in interdisciplinary research projects in biotechnology and biomedicine, optical science, materials science, or electrical engineering. Students receive academic credit for their research and benefit from a low student-to-faculty ratio. Graduate students are assigned individual projects and work closely with faculty members to build their own, original contribution to the scientific literature. Students have full access to and receive excellent training in the use of any departmental instrumentation needed to carry out their research. Results are presented at informal seminars, scientific conferences, and in articles published in high-quality, refereed journals. Research in the Department is funded in part from competitive grants obtained from agencies such as the American Chemical Society, National

Science Foundation, National Institutes of Health, DoD, DoE, Research Corporation, Dreyfus Foundation, North Carolina Biotechnology Center, UNC Charlotte Foundation, and private industry.

Tuition Waivers

Fellowships are available for students enrolled in the Master's degree program in Chemistry and for students seeking an interdisciplinary Doctoral degree through the Chemistry Department. Further information is available in the Department.

COURSES IN CHEMISTRY

CHEM 5090. Special Topics in Chemistry. (1-4)

Prerequisite: permission of the instructor. Selected topics in chemistry. Lecture and/or laboratory hours will vary with the nature of the course taught. May be repeated for credit. (*On demand*)

CHEM 5095. Topics for Teachers. (1-4) Prerequisite:

permission of the instructor. Selected topics in chemical education. Lecture and/or laboratory hours will vary with the nature of the course taught. May be repeated for credit. (*On demand*)

CHEM 5111. Instrumental Analysis. (3-4) Prerequisites:

Permission of the instructor. Selected modern instrumental methods of analysis, including theory and practice, with considerable attention given to the instrument and elementary electronics involved in the techniques. Two lecture hours and six hours of lab per week. (*Spring*)

CHEM 5121. Advanced Inorganic Chemistry. (3-4)

Prerequisites: Permission of the instructor. Theoretical inorganic chemistry including the application of physicochemical principles to the study of inorganic systems. Laboratory work involves inorganic preparations and characterization techniques. Three lecture hours and one laboratory period of three hours a week. (*Fall*)

CHEM 5133. Methods of Organic Structure

Determination. (2) Prerequisites: Permission of the instructor. Study and application of modern techniques, primarily spectroscopy, to determine the structure of organic molecules. One hour of lecture and one laboratory period of three hours each week. (*Spring*)

CHEM 5134. Organic Reaction Mechanisms. (2)

Prerequisites: Permission of the instructor. Mechanistic and theoretical topics which are beyond the scope of CHEM 2131/2132, including orbital symmetry control of organic reactions, the Hammett Equation and other linear free energy relationships, heterocyclic compounds, polycyclic aromatic compounds, organic photochemistry, carbenes, nitrenes, arynes and other short lived, reactive intermediates. (*Spring*) (*Alternate years*)

CHEM 5135. Concepts and Techniques in Organic Synthesis. (2) Prerequisite or corequisite: CHEM 5133, or permission of the instructor. Modern techniques of organic synthesis. Laboratory includes one or more multi-step syntheses of complex molecules. One hour of lecture and one laboratory period of three hours each week. *(Spring)*
(Alternate years)

CHEM 5165. Principles of Biochemistry I. (3) Prerequisite: satisfactory score on an organic chemistry proficiency exam, or permission of the instructor. A study of the structures, properties, and functions of biological molecules, bioenergetics of biological reactions, and enzyme catalysis, with particular emphasis on the underlying chemical principles, including thermodynamics and kinetics. *(Fall)*

CHEM 5165L. Principles of Biochemistry I Laboratory. (1) Prerequisite or corequisite: CHEM 5165. Physical properties of biological molecules and an introduction to experimental techniques in biochemical research. Eleven four-hour lab periods. *(Fall)*

CHEM 5166. Principles of Biochemistry II. (3) Prerequisite: CHEM 5165 with a grade of B or better. A study of various metabolic pathways and information transfer including molecular aspects of cell biology and genetics, with particular emphasis on the underlying chemical reactions, including thermodynamics and kinetics. *(Spring)*

CHEM 5167. Structure and Mechanism in Protein Chemistry. (3) Prerequisites: CHEM 5165, and either CHEM 5166 or BIOL 5171, or permission of the instructor. Examination of structures, properties, and functions of proteins, enzyme catalysis, and bioenergetics, emphasizing underlying mechanistic chemical and biochemical principles. *(Spring)* *(Alternate years)*

CHEM 5171. Biochemical Instrumentation. (4) Prerequisites: CHEM 5165 and 5165L with a grade of B or better or the permission of the department. Modern instrumental methods used in biorelated areas such as biochemistry, biotechnology and medical technology. Theory and practice. Potentiometry, spectrophotometry, chromatography, sedimentation, and electrophoresis. Two lecture hours and two three-hour laboratory periods per week. *(Spring)*

CHEM 5175. Physical Biochemistry. (3) Prerequisites: CHEM 5165, 5165L, and 5166, with a grade of B or better, or permission of the instructor. Colloid systems, equilibria in biological fluids, mass and energy transport in fluids and in association with membranes, energy storage and dissipation with relation to specific chemical bonding, enzyme kinetics. *(On demand)*

CHEM 5185. Chemical Fate of Pollutants. (3) Prerequisites: satisfactory score on chemistry proficiency exam, or permission of the instructor. Chemical reactivity

and fate of pollutants (in air, water, soil) in terms of their chemical structure and energetics, mechanisms, structure/energy relationships and their interaction with reactive environmental species including light. *(Spring)*
(Alternate years)

CHEM 5200. Computational Chemistry. (4) Prerequisite or corequisite: Permission of instructor. Electronic and molecular mechanics-based computational methods, including properties, optimized equilibrium and transition state structures and potential energy surfaces of reactions. Three lecture hours and three hours of laboratory each week. Additional projects required of graduate students. *(Fall, Spring)*

CHEM 6060. Special Topics and Investigations. (1-3) Prerequisite: permission of the instructor. Directed study of topics of current chemical interest. May be repeated for credit. *(On demand)*

CHEM 6069. Topics in Biochemistry. (3) Prerequisites: CHEM 6165, or permission of instructor. Discussion of current topics in biochemistry emphasizing their biomedical/biotechnological aspects from bioinorganic chemistry, bioorganic chemistry, bioanalytical chemistry, biophysical chemistry, biocomputational chemistry, biomaterials. May be repeated for credit. Three lecture hours per week. *(Spring)*

CHEM 6082. Surfaces and Interfaces of Materials Chemistry. (3) Prerequisites: Any three semesters of undergraduate calculus based mathematics (i.e., MATH 1241, 1242, and 2241) and an upper level undergraduate course in thermodynamics (i.e., CHEM 3142, PHYS 3151 OR MEGR 3112) or permission of the instructor. Theoretical basis, conceptual understanding and experimental investigations of the properties of surfaces and interfaces of various classes of materials will be presented. The content of this course will build from a rigorous derivation of the physical chemistry of surfaces and interfaces to a discussion of topical materials classes and specific materials properties. Three lecture hours each week. *(Alternate years)*

CHEM 6101. Biochemical Principles. (4) Prerequisite: Admission to the graduate program or permission of the instructor. Molecular biophysics of biological molecules. Bioenergetics of biological reactions and enzyme structure, mechanisms, and regulation. Metabolic pathways and the role of cellular organelles. Biochemical analysis methodology. Thirty-one two-hour lectures. *(Fall)*

CHEM 6115. Advanced Analytical Chemistry. (3) Prerequisite: CHEM 5111 with a grade of B or better, or consent of the instructor. The application of modern analytical methods to chemical problems. Emphasis is upon chemical information, particularly structural, obtainable from these techniques. May be repeated for credit. *(On demand)*

CHEM 6125. Theoretical Inorganic Chemistry. (3) Prerequisite: CHEM 5121 with a grade of B or better, or permission of the instructor. Group theoretical treatment of current theories of inorganic chemistry. Topics covered: Ligand field theory, molecular orbital theory for complex ions, electronic spectra of complex ions and the magnetic properties of complex ions. (*On demand*)

CHEM 6126. Organometallic Chemistry. (3) Prerequisites: Permission of instructor. Previous or concurrent enrollment in CHEM 5133 recommended. Synthesis, structure, characterization, and reactivity of organometallic compounds; introduction to catalysis and bioorganometallic chemistry. Three lecture hours each week. (*On demand*)

CHEM 6135. Advanced Organic Chemistry. (3) Prerequisite: CHEM 5133 and either 5134 or 5135 with a grade of B or better, or permission of the instructor. A qualitative discussion of modern mechanistic interpretation of the relations between structure and reactivity. Special emphasis is placed on the role of reactive intermediates such as carbonium ions, carbanions, carbines and radicals. (*On demand*)

CHEM 6138. Stereochemistry. (3) Prerequisite: Advanced course in Biochemistry or Organic Chemistry. Three-dimensional chemistry and its chemical, physical and biochemical consequences, emphasizing classification of isomers and stereoisomers and the consequences of molecular shape on chemical and biological properties. (*Spring*) (*Alternate years*)

CHEM 6145. Chemical Thermodynamics. (3) Prerequisite: Permission of the instructor. The postulatory basis of classical thermodynamics. Problems in chemical thermodynamics. The use of statistical mechanics for calculating thermodynamic functions. (*On demand*)

CHEM 6146. Rates and Mechanisms. (3) Prerequisite: Permission of the instructor. Consideration of chemical kinetics and mechanism schemes, particularly those of current interest. (*On demand*)

CHEM 6147. Molecular Photochemistry & Photophysics. (3) Prerequisite: Admission to graduate program or permission of instructor. An investigation of the excited states of organic molecules and the photophysics governing radiative and nonradiative transitions. Topics include electronic orbitals, absorption, emission, potential energy surfaces, energy transfer, photophysical radiationless transitions, singlet oxygen and chemiluminescent organic reactions. Three lecture hours per week. (*Alternate years*)

CHEM 6150. Seminar-Internship. (1-3) Prerequisite: Permission of the instructor. Required for all teaching assistants. Supervised experience in the teaching of college chemistry. May be repeated for credit. (*Fall, Spring*)

CHEM 6155. Polymer Synthesis. (3) Prerequisite: Permission of the instructor. Polymer structure, classification of polymerization reactions, theory and practice of step growth polymerization, radical, ionic and ring opening polymerizations, polymerization by transition metal catalysts. Recent advances in polymer synthesis. Three lecture hours per week. (*On demand*)

CHEM 6165. Advanced Biochemistry. (3) Prerequisites: CHEM 6101, BIOL 6102, 6103, 6104, or permission of instructor. Advanced course on protein structure, enzyme and mechanistic biochemistry, metabolic biochemistry, biophysical chemistry. Three lecture hours per week. (*Spring*)

CHEM 6681. Research Seminar. (1) Prerequisite: permission of the instructor. Individual investigation and exposition of the results. (*Fall, Spring*)

CHEM 6682. Research Seminar. (1) Prerequisite: permission of the instructor. Individual investigation and exposition of the results. May be repeated for credit. (*Fall, Spring*)

CHEM 6900. Research and Thesis. (1-16) Prerequisite: permission of the instructor overseeing thesis research. Laboratory research for the thesis. (*Fall, Spring, Summer*)

CHEM 7999. Master's Degree Graduate Residency Credit. (1) Prerequisite: permission of the instructor overseeing thesis research. (*Fall, Spring*)

CHEM 8069. Topics in Biochemistry. (3) Prerequisites: CHEM 6165, or permission of instructor. Discussion of current topics in biochemistry emphasizing their biomedical/biotechnological aspects from bioinorganic chemistry, bioorganic chemistry, bioanalytical chemistry, biophysical chemistry, biocomputational chemistry, biomaterials. May be repeated for credit. Three lecture hours per week. (*Spring*)

CHEM 8101. Biochemical Principles. (4) Prerequisites: Admission to Ph.D. program. Molecular biophysics of biological molecules. Bioenergetics of biological reactions and enzyme structure, mechanisms, and regulation. Metabolic pathways and the role of cellular organelles. Biochemical analysis methodology. Thirty-one two-hour lectures. (*Fall*)

CHEM 8147. Molecular Photochemistry & Photophysics. (3) Prerequisite: Admission to graduate program or permission of instructor. An investigation of the excited states of organic molecules and the photophysics governing the transitions between these states both radiative and nonradiative. Topics include electronic orbitals, absorption, emission, potential energy surfaces, energy transfer, photophysical radiationless transitions, singlet oxygen and chemiluminescent organic reactions. In this course each student will develop and demonstrate a photochemistry laboratory experiment that illustrates a principle or problem,

or new direction of photochemistry. Three lecture hours per week. (*Alternate years*)

CHEM 8155. Polymer Synthesis. (3) Prerequisite: Admission to Ph.D. program or permission of instructor. Polymer structure, classification of polymerization reactions, theory and practice of step growth polymerization, radical, ionic and ring opening polymerizations, polymerization by transition metal catalysts. Recent advances in polymer synthesis. The course will require a "Research Proposal". This will include a presentation in class as well as a ten page prospectus style manuscript. Three lecture hours per week. (*On demand*)

CHEM 8165. Advanced Biochemistry. (3) Prerequisites: CHEM 8101, BIOL 8102, 8103, 8104. Advanced course on protein structure, enzyme and mechanistic biochemistry, metabolic biochemistry, biophysical chemistry. Three lecture hours per week. (*Spring*)

Cognitive Science

- Graduate Certificate in Cognitive Science

Department of Psychology

4018 Colvard
704-687-4731
<http://cognisci.uncc.edu>

Director

Dr. Paula Goolkasian

Graduate Faculty

Anthropology

Diane Brockman, Assistant Professor

Computer Science

Tiffany Barnes, Assistant Professor
Mirsad Hadzikadic
Zbigniew Ras, Professor
William Ribarsky, Professor
Jing Xiao, Professor

Electrical and Computer Engineering

Yogendra Kakad, Professor

English

Boyd Davis, Professor
Pilar Blitvich Garces Conejos, Assistant Professor
Tony Jackson, Associate Professor
Alan Rauch, Associate Professor
Ralf Thiede, Associate Professor

Languages and Culture Studies

Richard File-Muriel, Assistant Professor

Philosophy

Marvin Croy, Associate Professor

Psychology

George Demakis, Associate Professor
Mark Faust, Associate Professor
Paul Foos, Professor
Jane Gaultney, Associate Professor
Paula Goolkasian, Professor
Nakia Gordon, Assistant Professor
Susan Johnson, Associate Professor
Charlie Reeve, Associate Professor
Lori Van Wallendael, Associate Professor

Software and Information Systems

Bei-Tseng (Bill) Chu, Professor
Celine Latulipe, Assistant Professor
Heather Lipford, Assistant Professor
Seok-Won Lee, Assistant Professor
Anita Raja, Assistant Professor
David Wilson, Assistant Professor

GRADUATE CERTIFICATE IN COGNITIVE SCIENCE

The Cognitive Science Certificate Program offers graduate students an opportunity for an interdisciplinary program of study. Training focuses on an understanding of human cognitive processes and the means by which complex mental processes can be modeled or simulated by artificial systems. Cognitive science is a dynamic and rapidly evolving field that studies intelligent systems by synthesizing the knowledge and methodology from the fields of cognitive psychology, artificial intelligence, linguistics, philosophy of mind and cognitive neuroscience. Students are provided with the conceptual framework and the technical skills necessary to enhance careers in research, teaching, business or government. Students completing the program add an interdisciplinary perspective to the training received in their major, better preparing them for employment or further study in a variety of sciences and social sciences. The certificate may be pursued concurrently with another graduate degree program at UNC Charlotte.

Additional Admission Requirements

The certificate program is open to all students who hold a bachelor's degree from an accredited university and either:

- 1) are enrolled and in good standing in a graduate degree program at UNC Charlotte, or
- 1) have a minimum GPA of 3.0 for their undergraduate courses.

Application for the Cognitive Science Certificate Program is made through the Office of Graduate Admissions.

Certificate Requirements

The Cognitive Science Certificate Program involves 15 hours of coursework. Students must take the required introductory course and at least two of the disciplinary courses. The remaining hours may come from any of the other topics courses listed. A cumulative GPA of 3.0 will be required and at most one course with a grade of C may be allowed toward the certificate.

Required

PSYC/ITCS/ITIS 6216 Intro to Cognitive Science

Disciplinary courses (Must take at least two)

PSYC 6116 Cognition
 ENG 5263/6263 Linguistics and Language Learning
 PHIL 6050 Philosophy of Mind
 ITCS 6150 Intelligent Systems

Topics

PSYC 5316 Cognitive Neuroscience
 PSYC 6015 Topics in Perception & Physiological Psychology,
 PSYC 6102/8102 Research Design & Quantitative Methods
 PSYC 6115 Sensation and Perception
 ITCS 5151 Intelligent Robotics
 ITCS 5152 Computer Vision
 ITCS 6153 Neural Networks
 ITCS 6156 Machine Learning
 ITCS 6158 Natural Language Processing
 ITCS 6159/8159 Intelligent Tutoring
 ITCS 6170 Logic for AI
 ITIS 6400/8400 Principles of Human Computer Interaction
 ECGR 5196 Introduction to Robotics
 ECGR 6102 Optimization of Engineering Designs
 ECGR 6266/8266 Neural Networks Theory & Design
 CEGR 5181 Human Factors in Traffic Engineering
 Topics, seminars, or other courses in the cognitive sciences approved by the Program Coordinator

COURSES IN COGNITIVE SCIENCE

CEGR 5181. Human Factors in Traffic Engineering. (3) Study of the driver's and pedestrian's relationship with the traffic system, including roadway, vehicle and environment. Consideration of the driving task, driver and pedestrian characteristics, performance and limitations with regard to traffic facility design and operation.

ECGR 5196. Introduction To Robotics. (3) Cross-listed as MEGR 4127. Prerequisites: ECGR 2103 or MEGR 2101 and senior standing. Modeling of industrial robots including homogeneous transformations, kinematics, velocities, static forces, dynamics, computer animation of dynamic models, motion trajectory planning, and introduction to vision, sensors and actuators. (*Fall*)

ECGR 6102. Optimization of Engineering Designs. (3) Prerequisite: ECGR 5101 or permission of department. The development of computationally feasible algorithms for solving optimization problems in engineering designs. Introduction to non-linear programming methods; study of constrained and unconstrained problems, linear programming problems and other related topics. (*On demand*)

ECGR 6266/ 8266. Neural Networks Theory and Design. (3) Topics include: Neural network model and network architectures; single layers, multiple layers network, perceptron learning rules; supervised hebian learning; performance optimization; widrow hoff learning; backpropagation; associative learning; competitive learning; grossberg network; Hopfield network; application of neural network. (*On demand*)

ENGL 5263. Linguistics and Language Learning. (3) Readings in, discussions of, and application of linguistically oriented theories of language acquisition, directed toward gaining an understanding of language-learning processes and stages. (*Yearly*)

ENGL 6070. Topics in English. (3) Selected topics of literature and language. May be repeated for credit as topics vary and with English Department approval. (*Fall, Spring*)

ITCS 5151. Intelligent Robotics. (3) Prerequisites: ITCS 1215 and MATH 2164, or permission of the department. General introduction to spatial descriptions and transformations, and manipulator position and motion. More study on robot planning, programming, sensing, vision, and CAD/CAM. (*Odd years, spring*) (*Evenings*)

ITCS 5152. Computer Vision. (3) Prerequisites: ITCS 1215 or MATH 2164, or permission of the department. General introduction to Computer Vision and its application. Topics include low level vision, 2D and 3D segmentation, 2D description, 2D recognition, 3D description and model-based recognition, and interpretation. (*Odd years, Spring*) (*Evenings*)

ITCS 6153. Neural Networks. (3) Prerequisites: ITCS 6114. Topics include: Basic notions and models of artificial neural nets; single layer neural classifiers; multilayer one-way neural nets; single layer feedback networks; neural models of associative memory; self organizing neural nets; translation between neural networks and knowledge bases; applications of neural networks. (*Even, Fall*) (*Evenings*)

ITCS 6156. Machine Learning. (3) Prerequisite: ITCS 6150 or permission of the department. Machine learning methods and techniques including: acquisition of declarative knowledge; organization of knowledge into new, more effective representations; development of new skills through instruction and practice; and discovery of new facts and theories through observation and experimentation. (*On demand*)

ITCS 6010. Topics in Computer Science. (3) Prerequisite: permission of the department. Topics in computer science selected to supplement the regular course offerings. May be repeated for credit as topics vary. *(On demand)*

ITCS 6170. Logic for Artificial Intelligence. (3) Prerequisite: ITCS 6150 or permission of the department. Introduction to basic concepts of logic for artificial intelligence, including declarative knowledge, inference, resolution, non-monotonic reasoning, induction, reasoning with uncertain beliefs, distributed information systems, intelligent information systems, planning and intelligent-agent architecture. *(On demand)*

ITCS 6150. Intelligent Systems. (3) Prerequisites: full graduate standing or permission of the department. To introduce core ideas in AI. Heuristic versus algorithmic methods; problem solving; game playing and decision making; automatic theorem proving; pattern recognition; adaptive learning; projects to illustrate theoretical concepts. *(Fall) (Evenings)*

ITCS 6158. Natural Language Processing. (3) Prerequisite: ITCS 6150. Principles, methodologies, and programming methods of natural language processing including foundations of natural language understanding, namely: lexical, syntactic, and semantic analysis, discourse integration, and pragmatic and morphological analysis. *(On demand)*

PHIL 6050. Philosophy of Mind. (3) This course addresses questions concerning the relationship between body and mind, the existence of other minds, the nature of consciousness, and the architecture of cognition. Approaches to these questions include traditional philosophical sources (emphasizing metaphysics and epistemology) and more recent developments in cognitive science (including the computational model of mind, mental representation, connectionist systems, and artificial intelligence). Also addressed are ethical and social issues involved in the design and implementation of intelligent systems. *(Yearly)*

PSYC 5316. Cognitive Neuroscience. (3) Prerequisite: graduate standing or permission of the instructor. Biological basis of consciousness and the neurobiology of mental processes by which we perceive, act, learn, and remember; representation of mental processes from electrophysiological and brain imaging techniques, clinical neurology, and computational science. *(Alternate years)*

PSYC 6015. Topics in Perception and Physiological Psychology. (3) An examination of selected topics in the areas of sensation and perception, physiological and neuropsychology, with an emphasis on the applications to the areas of clinical, community, and industrial psychology. May be repeated for credit with the permission of department. *(Alternate years)*

PSYC 6102/8102. Research Design and Quantitative Methods in Psychology. (3) Prerequisites: MATH 1222 and PSYC 2102 or equivalent. Experimental and correlational methods of psychological research, including single subject designs with emphasis on research design and the application of statistical methods to psychological research. *(Fall)*

PSYC 6115. Sensation and Perception. (3) Processes involved in receiving and interpreting sensory data including all the sensory systems with an emphasis on vision. *(On demand)*

PSYC 6116. Cognition. (3) Concerned with how humans acquire information, retain information in memory, and use this information to reason and solve problems. Current emphases include memory, category learning, planning, concept formation, problem solving, mental models, and knowledge representation. *(Alternate years)*

PSYC 6216. Introduction to Cognitive Science. (3) Cross-listed as ITCS 6216 and ITIS 6216. This course presents multiple perspectives on the study of intelligent systems. Broad coverage of such topics as philosophy of mind; human memory processes; reasoning and problem solving; artificial intelligence; language processing (human and machine); neural structures and processes; and vision. Also included is participation in the cognitive science seminar (Same as ITCS 6216, and ITIS 6216) *(Fall Semester)*

PHIL 6853. Internship in Ethics and Applied Philosophy. (3) On-site work in ethics and applied philosophy. Site and workload to be determined in consultation with a business, agency, organization or association and one faculty-internship advisor. Provides practical and professional training experience under conditions that the University cannot duplicate. *(On demand)*

PHIL 6857. Thesis. (3) Thesis may be taken during a single semester. Appropriate research and written exposition of that research is required. *(On demand)*

Communication Studies

- **M.A. in Communication Studies**
- **Graduate Certificate in Communication Studies**

Department of Communication Studies

5000 Colvard North
704-687-4005
www.gradcomm.uncc.edu

Coordinator

Shawn D. Long, M.P.A., Ph.D., Associate Professor

Graduate Faculty

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Loril Gossett, Associate Professor
Dan Grano, Assistant Professor
Bill Hill, Professor
Min Jiang, Assistant Professor
Dean Kruckeberg, Professor
Richard Leeman, Professor
Shawn D. Long, Associate Professor
Margaret Quinlan, Assistant Professor
Clifton Scott, Assistant Professor
Ashli Q. Stokes, Assistant Professor
Jillian Tullis-Owen, Assistant Professor

MASTER OF ARTS IN COMMUNICATION STUDIES

The Master of Arts in Communication Studies is designed to provide advanced study in the communication discipline, particularly in the areas of organizational communication, critical media and rhetorical studies, health communication, and public relations. All studies emphasize the ability to understand and analyze communication practices in different environments in the 21st Century. The curriculum is broad-based and is a balance of theory and application to practice.

Additional Admission Requirements

Students must meet all of the Graduate School requirements, including earning an acceptable score on the Graduate Record Examination and submit three letters of recommendation and a strong personal essay outlining their reasons for pursuing a master's degree.

Degree Requirements

The Master of Arts degree program requires the completion of thirty (30) credit hours of graduate work. All students, regardless of orientation and area of study, must complete

five (5) core courses. All Students writing a thesis or a directed project earn their final six (6) credit hours with research-based activities.

Note: No more than six (6) credit hours may be taken at 5000 level. Successful completion of the degree requires a minimum GPA of 3.0.

Post-Baccalaureate Study

The Department does allow students to take up to six (6) credit hours as a post-baccalaureate student; students must follow the Graduate School guidelines for application for this status. Students are encouraged to meet with the Graduate Coordinator as soon as possible after registering as a post-baccalaureate student to discuss application procedures and program options.

Admission to Candidacy Requirements

The official candidacy form must be filed by the date specified in the University Academic Calendar before graduation materials can be processed by the Graduate School. Students are responsible for securing the proper forms and meeting the filing deadlines set by the Graduate School for each semester. The candidacy form is available from the Graduate School website and must be filed with the Graduate School.

Assistantships

The Department has regular research/teaching assistantships available on a competitive basis to qualified students. Students must complete an assistantship application (available from the Graduate Coordinator) and return it to the Department for consideration as a graduate assistant. This form is available to students upon formal acceptance into the program. Out-of-state students from the sixteen (16) Southeastern U.S. states region opting for the International Public Relations concentration are also eligible to apply for Academic Common Market (ACM) program, which provides financial assistance in various forms, including in-state tuition consideration and assistantships, based on availability of funds.

In addition to the regular departmental assistantships, the department has specialized assistantships for students pursuing the international public relations emphasis. The assistantship covers tuition and health insurance with students responsible for university fees and living expenses. Information on all assistantships are available at the graduate website at www.gradcomm.uncc.edu.

Core Courses

- COMM 6011 Topics in Communication Research Methods
- COMM 6100 Communication Research Methods
- COMM 6101 Contemporary Viewpoints in Communication Theory
- COMM 6102 Professional Seminar in Communication Studies
- COMM 6103 Communication Ethics

Area Descriptions

Organizational Communication

Organizational communication focuses on the various ways individuals influence and are influenced by organizations and their members. Work in organizational communication is concerned with organizational culture and symbolism, interpersonal and group communication, change communication, globalization, mediated communication, leader communication, structural concerns of organizational communication, and critical analysis of organizational communication.

Media/Rhetorical Critical Studies

Graduate study of the mass media at UNC Charlotte concentrates on applied and critical research on the organization and effects of media industries and new media technologies. Areas of study include persuasion and popular culture, computer-mediated persuasion, computer-mediated communication, and the rhetoric of spectator sport.

Health Communication

Health communication is a field of study offering students a better understanding of the communication within a health context. This includes, but is not limited to, provider-patient interaction, the creation, promotion, and influence of health information, social and community health issues, organizational issues, media issues, and interpersonal health communication.

Public Relations

The focus of public relations is on building and maintaining internal and external relationships with entities essential to an organization's success, including entities such as media, activist groups, community groups, and regulators. The focus of UNC Charlotte's program is on public relations management, especially in the areas of issues tracking, corporate communication, crisis communication, not-for-profit communication, and international public relations efforts. One strand of the public relations track includes the opportunity to study public relations at a partner university outside the U.S. for a semester through the Academic Common Market program or via receiving one of the four international public relations assistantships.

Advising

Upon formal acceptance, all graduate students must meet with the Graduate Coordinator to file a proposed plan of study in the department and become familiar with the department's expectations. As students progress through their program of study, the Graduate Coordinator will assist them in selecting a suitable advisor and committee members for the thesis or directed project options.

Capstone Experiences

Students choose among three (3) options for their capstone experience: writing a thesis (6 credit hours); designing and conducting a directed project (6 credit hours); or taking the comprehensive examination (0 credit hours).

Thesis

A thesis is a written research document incorporating original research in a student's area of interest. Students select a thesis committee chair and two committee members and submit a proposal to them. The written thesis is defended before the thesis chair and committee members in the semester the student graduates. A thesis must be written and defended within six (6) calendar years after admission into the Communication Studies master's program.

Directed Project

A directed project is an applied research document involving research and application to a real world problem or opportunity. Students select a directed project chair and two committee members and submit a project to them. The completed project is presented to the directed project chair and committee members in the semester the student graduates. A directed project must be successfully completed and presented within six (6) calendar years after admission into the Communication Studies master's program.

Comprehensive Examination

The comprehensive examination is a six-hour, written examination covering communication theory, communication research methods, and a third comprehensive area each student designates as his/her specialty area of study in communication. Students opting to take the comprehensive examination should indicate their intention to the Graduate Coordinator in the semester previous to the one in which they plan to sit for the examination. The examination itself carries no credit hours; students selecting this option must take six (6) additional credit hours to reach the thirty (30) hour credit requirement. These six credits may be taken in Communication Studies or a related department with the Graduate Coordinator's approval. The comprehensive examination must be successfully completed within the six (6) year master's time limit for degree completion.

Application for Degree

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

GRADUATE CERTIFICATE IN COMMUNICATION STUDIES

The Graduate Certificate in Communication Studies is designed to provide advanced study in the field of communication. The program emphasizes the ability to understand and analyze communication practices in the 21st century. The curriculum is broad based, and includes opportunities to study the theory and practice of communication in the areas of organizational

communication, public relations, mass media, and health communication.

Additional Admission Requirements

GRE, personal statement, three letters of recommendation.

Certificate Requirements

Fifteen (15) credit hours in graduate communication courses, including COMM 6100 Communication Research Methods and COMM 6101 Contemporary Viewpoints in Communication Theory, with no more than six (6) credit hours at the 5000 level are required.

Core Courses

COMM 6100 Communication Research Methods
COMM 6101 Contemporary Viewpoints in
Communication Theory

Advising

All incoming students are advised by the Graduate Coordinator. Students are free to designate another graduate faculty member of the Department of Communication Studies as their advisor of record.

COURSES IN COMMUNICATION STUDIES

COMM 5000. Topics in Communication Studies. (3) Timely and important areas relevant to communication studies. May be repeated for credit with permission of the graduate advisor. (*On demand*)

COMM 5101. Media and the Law. (3) Survey of legal rights, restrictions, and ethical considerations in field of communication including the First Amendment, libel, invasion of privacy, obscenity law, regulation of electronic media, relationships between media and judiciary. (*On demand*)

COMM 5102. Federal Interpretation of the First Amendment. (3) In-depth case analysis of tests determining Constitutional boundaries of expression including clear and present danger, prior restraints, fighting words/symbolic speech, strict scrutiny, obscenity, indecency. (*On demand*)

COMM 5115. Seminar in Health Communication. (3) Course provides in-depth examination of a major area of health communication utilizing extensive readings, discussion and written work. (*Yearly*)

COMM 5141. Advanced Organizational Communication. (3) Critical examination of the communication practices of organizations which accomplish such tasks as establishing organizational identification, influencing organizational members, and making decisions. Includes application of research methods to assess and analyze an organization's communication practices. (*Fall, Spring*)

COMM 5147. London Seminar in International Public Relations. (3/3) Course examines the complexities of public relations practice in an international setting. The seminar is taught by UNC Charlotte faculty at Regent's College in London for four weeks each summer, from mid-May through mid-June. The agenda begins with an overview of the factors that complicate communication across cultures and borders, then examines how those factors affect public relations practice in specific global regions. Principles acquired during this course will aid in improving international and cross-cultural public relations practice, and contribute to success in any profession. The seminar includes participation as guest speakers by London-based practitioners as well as visits to UK organizations relevant to international PR practice. (*Annually*)

COMM 6000. Topics in Communication Studies. (3) Intensive investigation of a timely and important topic in communication studies. The topic of investigation may vary from semester to semester. May be repeated for credit with permission of graduate advisor. Topics courses include: Public Relations Issues Management, Public Relations Theory, Facilitating Corporate Social Responsibility, Integrated Communication, Sports & Rhetoric, and Fundraising. (*On demand, Evenings*)

COMM 6011. Topics in Communication Research Methods. (3) Prerequisite: COMM 6100 or permission of the instructor. Focused and advanced instruction on a specific data analytic methodology relevant to communication studies. Sample foci may include—but are not limited to—focus groups, textual analysis, regression, interviewing, structural equation modeling, ethnographic analysis, hierarchical linear modeling. (*Yearly*)

COMM 6100. Communication Research Methods. (3) Methods for systematic investigation of communication behavior. Theoretical and practical applications of both qualitative and quantitative research methodologies are utilized for completion of original projects. (*Spring, Evenings*)

COMM 6101. Contemporary Viewpoints in Communication Theory. (3) A survey of the leading theoretical traditions in communication studies. Covers both qualitative and quantitative approaches to conceptualizing communication practices. (*Fall, Evenings*)

COMM 6102. Professional Seminar in Communication. (3) Examination of the academic study of communication. The course investigates the role of paradigms and use of the scholarly method. Students develop a scholarly project through a seminar approach. (*Fall*)

COMM 6103. Communication Ethics. (3) Discussion and analysis of inherently ethical elements of communication praxis in public, community, institutional and organizational domains. Exploration of practical,

philosophical and theoretical concerns that affect everyday matters of moral choice and judgment. (*Spring*)

COMM 6110. Advanced Persuasion. (3) Analysis of theories of persuasion as a mode of social influence. Focus on the understanding and analysis of how persuasion works in various communicative contexts including mass-mediated, public relations, organizations and public advocacy. (*On demand, Evenings*)

COMM 6120. Communication and Network Society. (3) Examines the social dynamics arising from the global embrace of revolutionary communication technologies. Topics include the forces that shape new information flows and the effects emergent technologies exert across nations, local communities and individuals. (*On demand, Evenings*)

COMM 6121. Communication and the Internet. (3) This course considers the Internet as a social, cultural and political phenomenon. It will study and debate the competing visions of how the Internet does, can and should play a role in reshaping society. It will explore how the computer and network technologies shape communities as well as individual identities. The course will also address questions of law and public policy connected to issues of access, intellectual property and censorship. (*On demand, Evenings*)

COMM 6130. Textual Analysis. (3) The application of qualitative methods of language and rhetorical analysis to communication artifacts. The course uses a seminar approach to learn close textual analysis. Methodologies include dramatism, situational analysis, genre, metaphor, perspectival and postmodern paradigms. (*On demand, Evenings*)

COMM 6141. Organizational Communication Case Studies. (3) Communication theories are applied to real and fictional organizational cases. Topics such as culture, diversity, change, networks, and diffusion of innovations are examined from a communication perspective. (*Yearly, Evenings*)

COMM 6142. Seminar in Organizational Communication. (3) Using a seminar approach, this course surveys the theoretical approaches to the study of organizational behavior from a communication perspective. The course particularly focuses on issues of communication, roles and leadership. (*On demand, Evenings*)

COMM 6143. Organizations and Communication Technology. (3) This course studies the theories and concepts of how communication and technologies interact to shape organizational structures and communication processes. (*On demand, Evenings*)

COMM 6145. Communication Campaign Management. (3) A blending of theory and application to public relations/communication campaigns. The application dimension stresses mastery of the technical aspects of the

campaign: research, problem-solving, planning, evaluation, and teamwork. The theoretical dimension stresses the study of actual campaigns and formulating generalizations regarding their successes or shortcomings. Class members serve on account teams with the instructor as manager. Account teams represent real-world clients and prepare a campaign book for the client's later implementation. (*Yearly, Evenings*)

COMM 6146. Media Relations. (3) This course will draw on academic and professional research to study the communication strategies and tactics associated with establishing and maintaining effective relations between public relations practitioners and the media. (*Yearly, Evenings*)

COMM 6170. Communication Law and Policy. (3) Survey of legal rights, legal restrictions, and policy developments governing public communication in the United States. (*On demand, Evenings*)

COMM 6880. Independent Study. (3) Prerequisites: Permission of instructor and graduate coordinator. Area of study beyond the scope of current offerings to be devised by student and faculty member. May be repeated. (*Fall, Spring, Summer*)

COMM 6995. Directed Project in Communication. (3 or 6) May be repeated by permission of the Graduate Coordinator, if taken for three hours credit. Six hours of Directed Project may be taken during a single semester. Design, implementation, presentation and evaluation of an approved applied research project in student's specialty area. The Directed Project is of the student's own design under the supervision of a research advisory committee. (*On demand*)

COMM 6999. M.A. Thesis. (3 or 6) May be repeated by permission of the Graduate Coordinator, if taken for three hours credit. Six hours of Thesis may be taken during a single semester. Appropriate research and written exposition of that research is required. The Thesis is proposed and defended under the supervision of a research advisory committee. (*On demand*)

COMM 7999. Master's Degree Graduate Residency Credit. (1) Required for continuing registration and enrollment. May be repeated with permission of the Graduate Coordinator. (*On demand*)

Criminal Justice

- **M.S. in Criminal Justice**

Department of Criminal Justice & Criminology

5062 Colvard

704-687-2563

www.criminaljustice.uncc.edu

Coordinator

Dr. Michael G. Turner

Graduate Faculty

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Beth Bjerregaard, Associate Professor

Anita Blowers, Associate Professor

Robert Brame, Professor

Charisse Coston, Associate Professor

Charles Dean, Professor Emeritus

M. Lyn Exum, Assistant Professor

Paul C. Friday, Professor

Jennifer Hartman, Assistant Professor

Joseph B. Kuhns III, Assistant Professor

Vivian Lord, Chair and Professor

Kathleen Nicolaides, Senior Lecturer

Michael G. Turner, Associate Professor

MASTER OF SCIENCE IN CRIMINAL JUSTICE

The Master of Science degree program in Criminal Justice is designed to promote broad based study of the phenomenon of crime and to enhance career opportunities in the field of criminal justice. The program utilizes the social and behavioral sciences in an interdisciplinary approach to study law, crime, and social deviance, and to examine critically the systems created in response to deviance and crime. The objectives of the program are to: (1) provide present and future criminal justice personnel with the educational background necessary to function effectively in the dynamic field of criminal justice; (2) familiarize students with the nature, methods, and functions of research, and with the existing body of knowledge on criminal justice; (3) provide the criminal justice system with qualified candidates for careers in the field; and (4) prepare students for entrance into doctoral programs. Career opportunities available in the criminal justice system include law enforcement, corrections, administration, planning and analysis, juvenile justice, and college instruction. There are also private sector careers available, including private security. Students may enroll in the program on either a full-time or part-time basis. Many classes are scheduled in the evening to accommodate the part-time student.

Additional Admission Requirements

Admission to the Criminal Justice graduate program is open to students with bachelor's degrees in any discipline who meet the general requirements for admission to the Graduate School, provided they meet the following requirements. Applicants must have a grade point average of at least 3.0, a satisfactory score on the Graduate Record Examination (GRE), a personal statement, and three strong recommendation letters from those who are able to attest to your academic ability.

Degree Requirements

A minimum of 36 semester hours is required. Eighteen of these 36 hours must be in courses open only to graduate students (6000 level and above). All students must complete each of the following six core courses with a grade of *B* or above: CJUS 6100 (Criminal Justice Policy); CJUS 6101 (The Nature and Theory of Crime); CJUS 6102 (Research in Criminal Justice I); CJUS 6103 (Research in Criminal Justice II); CJUS 6104 (Criminal Justice and Social Control); and CJUS 6105 (Criminal Justice Seminar).. A maximum of 12 hours may be taken outside the Criminal Justice Department, and a maximum of six hours with grades of *B* or above may be transferred from another institution. Transfer courses must be consistent with the program and will be accepted at the discretion of the department. At least 30 semester hours must be taken in residence. To complete the program, students have the option of taking a comprehensive examination or writing a thesis.

Assistantships

The Criminal Justice Department offers graduate assistantships which are awarded solely on the basis of academic merit.

Financial Aid

In addition to the graduate assistantships, the department offers, as available, research assistantships and grant-funded opportunities for students. In addition, the competitive Dean Reep Scholarship is available for an incoming graduate student each year.

Comprehensive Examination

The comprehensive examination is offered each Fall and Spring semester. Anyone who has successfully completed all of their core courses with a "B" or better and two electives is eligible to take the examination. The comprehensive examination may be taken no more than two times.

COURSES IN CRIMINAL JUSTICE

CJUS 5000. Topics in Criminal Justice. (3) Specialized criminal justice topics. May be repeated for credit. (*Fall, Spring*)

CJUS 5101. Drugs, Crime and the Criminal Justice System. (3) Provides an overview of the current state of

drug use in this country and throughout the world and examines the nature and extent of drug use, the history of drug use/ abuse, contemporary drug use patterns, licit and illicit drug dealing and trafficking, crime and violence associated with drug use and drug markets, drug control strategies at the local, state, national and international level, treatment level, treatment options and alternatives, drug policy issues, legalization debates, and prevention strategies. *(On demand)*

CJUS 5103. International Criminal Justice. (3) Examination of the patterns and trends in international crime such as terrorism, transnational organized crime, and trafficking in people and a review of how the legal traditions of common law, civil law, Islamic law and socialist legal systems are structured and function criminal justice systems of the United States and other nations. *(On demand)*

CJUS 5160. Victims and the Criminal Justice System. (3) Relationship between victims of crime and the criminal justice system. Specific topics include an analysis of the characteristics of crime victims, victim reporting patterns, treatment of victims by the various segments of the criminal justice system, victim assistance programs, and the issue of compensation and/or restitution for victims of crime. *(On demand)*

CJUS 5161. Violence and the Violent Offender. (3) Issues surrounding violence in today's society and their impact on offenders involved in homicide, child and domestic abuse, and other forms of violence. Examination of myths about violence, victim-offender characteristics and relationships, and theories of violence. *(On demand)*

CJUS 5162. Sexual Assault. (3) Comprehensive and critical examination of sexual exploitation in the United States. *(On demand)*

CJUS 6000. Topics in Criminal Justice. (3-6) Specialized criminal justice topics. May be repeated for credit. *(On demand)*

CJUS 6100. Criminal Justice Policy. (3) Examination of the criminal justice subsystems (law enforcement, courts, corrections) with particular focus on the development of policy and the effectiveness of current policies aimed at reducing crime. *(Fall)*

CJUS 6101. The Nature and Theory of Crime. (3) Definitions and patterns of criminal behavior. Major theoretical perspectives on crime, including historical, philosophical, individual, community-oriented and societal approaches. *(Fall)*

CJUS 6102. Research in Criminal Justice I. (4) Introduction to research methodology and statistics with emphasis on applications to criminal justice settings. Topics to be covered include problem selection, theory, hypothesis formulation, research design, sampling, measurement, and proposal writing. *(Fall)*

CJUS 6103. Research in Criminal Justice II. (4) Prerequisite: CJUS 6102. Advanced research methodology with emphasis on conducting, presenting and evaluating research in criminal justice settings. Topics to be covered include data collection, data input, data analysis, and interpretation. *(Spring)*

CJUS 6104. Criminal Justice and Social Control. (3) Examines how the law functions as a powerful tool of social control in our society. Particular emphasis is given to understanding the constitutional limitations placed on the construction of law, the elements of criminal offenses, and criminal defenses. *(Spring)*

CJUS 6105. Criminal Justice Seminar. (1) An introduction to the criminal justice faculty, their research areas of expertise, and the type of projects with which they are currently involved. *(Fall)*

CJUS 6120. Criminal Justice Management and Decision-Making. (3) Application of generic principles of management and supervision to operational problems confronted by criminal justice agencies with particular attention to decision-making and discretion in criminal justice settings. *(On demand)*

CJUS 6130. Law Enforcement Systems. (3) Consideration of the elements of law enforcement agencies as subsystems of the total criminal justice system. Comparisons of law enforcement systems in other countries is also considered. *(On demand)*

CJUS 6131. Police Problems and Practices. (3) Research on current issues in law enforcement with emphasis on the legal, social, and institutional contexts in which they occur. *(On demand)*

CJUS 6132. Legal Issues in Law Enforcement. (3) Law applicable to the functions of police administrators and line police officers including constitutional, statutory, judicial, and administrative law governing search and seizure, arrest, interrogation, use of force, jurisdiction, civil and criminal liability of administrators and officers, and the rights of officers and suspects. *(On demand)*

CJUS 6140. Prosecution and Adjudication Processes. (3) Functions and powers of prosecutors, defense attorneys, judges and juries including plea bargaining and court procedure. *(On demand)*

CJUS 6150. Corrections. (3) Functions of correctional agencies, principles of punishment and a historical analysis of correctional institutions and programs including prisons, jails, probation and parole systems. *(On demand)*

CJUS 6151. Correctional Strategies: Rehabilitation and Reintegration. (3) Efforts to change offender behavior and to facilitate the development of offender-community linkages. Institutional classification and treatment strategies,

pre-release and temporary release programs, innovative uses of probation and parole systems, community residential programs and new dispositional models; e.g., sentencing to community service and restitution. *(On demand)*

CJUS 6152. Legal Issues in Corrections. (3) Major legal issues pertaining to corrections, including sentencing, probation, restitution, prisons, parole, pardon and restoration of rights with emphasis on legal issues often confronted by correctional administrators and probation and parole personnel. *(On demand)*

CJUS 6160. Juvenile Justice Systems. (3) The process by which specific behaviors are identified as delinquent and the responses of the juvenile justice system to such behaviors. Laws dealing with the juvenile justice system, the historical development of the system, and the effectiveness of innovative responses to delinquency. *(On demand)*

CJUS 6170. Program Planning and Evaluation in Criminal Justice. (3) Applied research as a foundation for criminal justice planning and evaluation. Emphasis on the interrelationship of planning and evaluation within program management. *(On demand)*

CJUS 6800. Directed Individual Study in Criminal Justice. (1-6) supervised investigation of a criminal justice problem of special interest to the student. May be repeated one time with the approval of the student's major professor or academic committee. *(Fall, Spring, Summer)*

CJUS 6901. Thesis I. (3) Students taking this course will work on developing a research proposal of a significant criminal justice topic approved by the student's thesis committee. The final proposal will include an extensive literature review and a detailed discussion of the research plan. Graded credit/no credit. *(Fall, Spring, Summer)*

CJUS 6902. Thesis II. (3) Prerequisite: CJUS 6901. Students taking this course will conduct independent research developed in CJUS 6901, successfully defend the research in an oral defense meeting, and have the final written thesis approved by the graduate school. Graded credit/no credit. *(Fall, Spring, Summer)*

CJUS 6903. The Applied Research Project. (3) Prerequisite: must pass the qualifying examination, have a research project and Human Subjects Approval, where necessary. Students will develop a major paper on a topic of criminal justice importance. It is designed to be completed within one semester. This project is typically designed for research in agencies within the community and must be successfully defended in an oral defense meeting. It is geared towards the terminal Master's student and not appropriate for those seeking the doctorate. Graded credit/no credit. *(Fall, Spring, Summer)*

CJUS 7999. Master's Degree Graduate Residency Credit. (1) *(Fall, Spring, Summer)*

Earth Sciences

- **M.S. in Earth Sciences**
- **Ph.D. in Infrastructure and Environmental Systems** *(with the College of Engineering)*

Department of Geography and Earth Sciences

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Anne Jefferson, Assistant Professor
Walter Martin, Associate Professor
Ross Meentemeyer, Associate Professor
William Toole, Juris Doctor

MASTER OF SCIENCE IN EARTH SCIENCES

The Department of Geography and Earth Sciences offers a Master of Science in Earth Sciences degree with opportunities for study and research in the areas of geology, hydrology, atmospheric science, remote sensing, GIS and environmental science. We also offer, in conjunction with the College of Engineering, a Ph.D. in Infrastructure and Environmental Systems (INES). Please see the Inter-College Graduate Programs section of this *Catalog* for a complete description of the requirements for the INES Ph.D.

Our combined Geography and Earth Sciences Department offers Earth Sciences graduate students personal guidance typical of a relatively small department, with the field, laboratory, GIS and cartographic facilities and resources that accompany a much larger Earth Sciences department. Within this context, you will find a healthy combination of both field- and model-based Earth Sciences research as well as applied and academic research opportunities.

Our Earth Sciences faculty offer classes and are active in specific research areas that include surface and groundwater hydrology, vadose zone processes, geochemistry, marine geology and volcanology, biogeochemistry, mineralogy, structural geology, remote sensing, soil science, Quaternary geology, surficial processes, fluvial processes and depositional environments, clastic and carbonate sedimentology, basin analysis, stratigraphy, coastal geology, paleoecology, macro- and micropaleontology, environmental geology, hydrology and sedimentology, applied climatology, numerical weather prediction, severe weather, and tropical meteorology.

The program is designed to address a range of student needs and to be completed in two years of full-time study. Graduates of the program will employ their expertise in a wide variety of activities and will be prepared for careers such as environmental consultants, geologists in the energy and mining industries, regulators in governmental agencies, students in doctoral programs, and earth science teachers in secondary schools. The M.S. in Earth Sciences prepares students for admission to traditional Geology and Earth Science Ph.D. programs as well as interdisciplinary Ph.D. programs such as Infrastructure and Environmental Systems.

Please refer to the *Department of Geography and Earth Sciences Graduate Handbook* for more details on deadlines and procedures.

Additional Admission Requirements

It is the policy of the Department to provide equal opportunities to all students regardless of race, creed, color, sex, or national origin. The Department requires applicants to demonstrate evidence of suitability for the program.

All applications for admission are reviewed by the Earth Sciences Graduate Committee. The Department admits applicants on a competitive basis as space in the program allows.

- 2) *Grade Point Average (GPA)*: The Department expects an overall GPA of at least 2.75 (3.0 for junior and senior years). However, exceptions may be made if the other elements of the application are strong.
- 2) *Letters of Recommendation*: Three letters of reference are required. Letters from college or university teachers who have worked with and/or taught applicants are preferred. These letters are evaluated on the basis of how well the applicant is suited in terms of intellect, preparation and motivation to perform graduate work.
- 3) *Personal Essays*: Applicants must write a personal essay which directly addresses reasons for the desire to conduct graduate work in Earth Sciences as well as the desire to participate in the M.S. program at UNC Charlotte. Applicants should comment on their expectations regarding the benefits of an M.S. in Earth Sciences. Lastly, applicants should address directly how

the program at UNC Charlotte fits their career and/or professional goals and how they would benefit from and contribute to the M.S. in Earth Sciences at UNC Charlotte. The essay is very important in determining the applicant's commitment to graduate education and to a professional career in earth sciences or a related field. Careful preparation of the essay is time well spent.

- 4) *Scores on the Graduate Record Exam (GRE)*: In general the Department expects minimum scores of 1000 on the combined verbal and quantitative portions of the Graduate Record Exam. Lower scores will not automatically exclude applicants if the remainder of the applicant's file is strong.
- 5) *Transcripts of College Course Work*: The transcripts are evaluated on the basis of performance in a range of earth sciences, physical sciences and mathematics courses in order to determine the applicant's preparation for graduate level course work.

Additional Requirements for International Applicants: Applicants whose native language is not English must score at least 557 (paper based) or 220 (computer based) on the Test of English as a Foreign Language (TOEFL).

Prerequisite Requirements (Minimum Requirements for Students Entering the Program):

All prospective graduate students must demonstrate competence in undergraduate subject matter in their area of study. While the Department does not require that applicants have a degree in Earth Sciences, prospective graduate students should provide evidence that they are prepared to immediately take full advantage of graduate level course work in Earth Sciences.

Students applying to the program should, at a minimum, be familiar with the concepts and materials offered in courses such as: Physical Geography, Physical Geology, Earth History, Introductory Chemistry, Introductory Physics, and calculus-based Mathematics. These courses or their equivalents are required for admission to the UNC Charlotte M.S. in Earth Sciences program. Any student wishing to pursue additional training in Geographic Information Systems (GIS) should have basic cartography preparation and computer file management and data base skills.

All decisions concerning the equivalency of courses in an applicant's transcript to those listed as minimum requirements for entry in the M.S. in Earth Sciences are the responsibility of the Graduate Committee and the Department Chair.

Assistantships

Assistantships are much like a part-time job for the student. As we try to find work settings that fit the student's academic interest, these assistantships can also offer valuable training opportunities and work experience. The nature of a research assistantship depends entirely on the needs of the

supervising faculty member. Teaching assistantships are assigned on the basis of the student's academic background.

Graduate assistantships are arranged for either one entire semester or for an entire academic year (2 semesters or 9 months). They are normally scheduled for 16 weeks per semester and the student is expected to work 20 hours per week. The Department makes every effort to provide funding to every full-time student in the program.

Degree Requirements

The program requires a minimum of 36 hours of graduate credit. The student must complete at least 18 of the 36 credit hours in courses at the 6000-level or above. Of these at least nine credits will consist of ESCI 6900 Earth Science Research (see description below).

Up to six graduate credits may be accepted as transfer credit. Only courses with grades of A or B earned at an accredited university are eligible. Transfer credits are not automatic and require the approval of the Graduate Coordinator and the Graduate School. The amount of transfer credit may not exceed the limit set by the Graduate School (6 hours).

We anticipate that students will select courses from our department and may choose coursework from Civil and Environmental Engineering, biology, chemistry, and physics in support of particular emphases within our program. For example, certain geo-technology or waste disposal courses in Civil and Environmental Engineering may be appropriate for the student pursuing problems in environmental earth sciences. Students examining the interaction of geology and the biosphere may include ecology or botany courses in the Biology Department or organic chemistry courses in the Chemistry Department in their program of study. Students must meet other departments' course prerequisite requirements or receive permission from the instructor before registering for out of department coursework.

A student is expected to achieve A's or B's in all course work taken for graduate credit and must have at least an average of B (3.0) in order to graduate. An accumulation of more than two "C" grades will result in suspension of the student's enrollment in the graduate program. A grade of "U" will result in the immediate suspension of that student's enrollment in the graduate program. Readmission to the program would require approval of the Graduate Coordinator, Department Chair and Dean of the Graduate School.

Advising

A student's advisor guides the student through the design and implementation of a program of study and research tailored to the student's specific needs and career goals. The advisor generally is available to the student for advice on academic and other problems. Students may choose an advisor based on their own interests, or an advisor can be assigned. Students may change advisors by obtaining advanced permission from the faculty member with whom

they wish to work. No student will be allowed to register for classes without the signature of his/her advisor.

Plan of Study

All students are required to formulate a complete plan for their M.S. before completion of the 2nd semester for full-time students, and before the completion of 18 hours for part-time students. This plan will include at a minimum the names of the student's research committee members (see below), a plan of study for all coursework that will be completed during the degree, and at least one proposal presentation for ESCI 6900 (see below). The plan of study must be approved by all committee members as well as the Earth Sciences Graduate Coordinator, and serves as a guide to coursework and research while at UNC Charlotte.

Committees

All final research projects are evaluated by a faculty committee known as the research committee. Research committees must have a minimum of three members composed of the graduate faculty of the Department or associated departments. Additional members are acceptable and in many cases outside members, other departments, or internship coordinators from off-campus agencies are advisable.

Written Comprehensive Examination

To complete the program, each student must pass a comprehensive examination covering general aspects of the discipline. This exam should be administered before beginning the 3rd semester. This is a written exam in which the student must respond to questions submitted by the faculty. These questions will examine knowledge from the area of study and coursework completed by the student to date in the program. The questions are solicited from the entire graduate faculty of the Department by a memo from the student's primary research advisor who then administers the examination. This exam may not be administered if the student has outstanding incomplete grades in any graduate course work.

Earth Sciences Research

All MS Earth Sciences students must complete 9 credits of ESCI 6900 Earth Sciences Research. Students can pursue research experiences that are appropriate to individual student's interests and experience, departmental faculty resources and the availability of opportunities that exist to work with allied agencies or clients on or off campus. While it is possible to carry out more than one project to satisfy the 9 credit requirement, one of the research projects must constitute at least 6 credit hours.

For research projects of 6 or more credit hours, students must prepare and orally present a research proposal that clearly outlines the purpose and scope of the research. The proposal presentation must be completed before the beginning of the 3rd semester for full-time students. The final results of all research projects must be written up in a research document whose format will be agreed upon by the

student's committee. That document must be formally approved by the student's research committee. Research projects that constitute 6 or more credit hours must also be orally defended (see below).

The Defense of the Research Project

When the advisor is satisfied that the student's research and writing has progressed sufficiently the research document is provided to the other members of the research committee. If they agree that the document is ready for a defense, an oral exam is scheduled. The advisor must then formally notify every member of the Department's graduate faculty of the date, time, place and the topic (title with abstract) of the defense. A copy of the document to be defended will be placed in the Geography and Earth Sciences office one week before the defense for review by all interested faculty.

Admission to Candidacy

An application for admission to candidacy should be filed upon successful completion of a minimum of 18 semester hours of graduate work and no later than four weeks prior to the beginning of the semester in which the student expects to complete all requirements for the degree. Completed forms should be forwarded to the Graduate School.

Graduate Coursework

The Master in Earth Sciences graduate program generally follows a traditional numbering scheme with 5000 and 6000 level courses. The 5000 level numbers identify courses that cover accepted bodies of knowledge within the earth sciences with the emphasis placed on mastery and critical assessment of the theoretical and empirical foundations within the discipline. The 6000 level courses are divisible into two categories. The first category is the Earth Systems topic courses wherein graduate students review and analyze the dominant current working hypotheses that drive contemporary research within conceptual areas such as geodynamics, global biogeochemical cycles, or climate change. The second 6000 level category is the directed research courses. This category provides the framework for graduate students to complete the research requirements within the program and also identifies the area of concentration of the directed research. This framework permits the assignment of appropriate faculty for research supervision.

COURSES IN EARTH SCIENCES AND GEOLOGY

Earth Sciences

ESCI 5000. Selected Topics in Earth Sciences. (1-4) Prerequisites: ESCI 1101, GEOL 1200-1200L, or permission of the instructor. In-depth treatment of specific topics selected from one of the fields of the earth sciences. May be repeated for credit as topics vary. (*On demand*)

ESCI 5140. Hydrologic Processes. (4) Prerequisite: ESCI 1101 or GEOL 1200-1200L or permission of the instructor. Atmospheric, soils and geologic aspects of surface and ground water processes. Three lecture hours and one three-hour lab per week. (*Fall*)

ESCI 5150. Applied Climatology. (3) Prerequisite: METR 3250 or permission of instructor. Methods of acquiring and analyzing climatic data in various types of applied problems. Emphasis on methods to assess and reduce the impact of weather and climate upon human activities. (*Spring*)

ESCI 5155. Fluvial Processes. (4) Prerequisites: ESCI 1101-1101L, GEOL 1200-1200L, or permission of the instructor. Hydrologic and geomorphic study of the transport of water and earth materials within stream systems. Erosion, mass wasting, open channel flow, sediment transport, flooding, stream channel morphology, morphometry of drainage basins, and related topics. Three lecture hours, three lab hours per week. (*Spring*)

ESCI 5170. Fundamentals of Remote Sensing. (4) Prerequisite: ESCI 1101 and GEOL 1200, or permission of the instructor. Physical fundamentals of remote sensing and overview of airborne and satellite systems operating in the visible, infrared, and radar regions, and a review of applications for resource exploration, environmental studies, land use and land cover analysis, and natural hazards. One 2-1/2 hour lecture, and one three-hour lab per week. (*On demand*)

ESCI 5180. Digital Image Processing in Remote Sensing. (4) Prerequisite: ESCI 5170 or permission of instructor. Scientific and computational foundations of digital image processing techniques for extracting earth resource information from remotely sensed data. Three lecture hours and three lab hours per week. (*Spring*)

ESCI 5210. Soil Science. (4) Prerequisites: GEOL 3124, GEOL 3115 or permission of instructor. Study of soils, soil-forming processes and soil morphology with an emphasis on soils as they relate to geologic landscapes and surficial processes. Students will learn how to describe and interpret soils in the field. Three hours lecture, three hours lab per week with occasional field trips. Graduate students will fulfill the requirements of ESCI 4210. In addition, graduate students will be required to acquire laboratory and interpretive skills in soil chemical analyses and will have additional writing assignments for the course. (*Fall*)

ESCI 5222. Watershed Science. (3) Prerequisites: ESCI 4140/5140 or permission of the instructor. Examination of the cycling of water and chemical elements in natural and perturbed watersheds with emphasis on linkages between the hydrologic and biogeochemical processes which control runoff water quality. Topics include runoff processes, evapotranspiration, nutrient export and stream, riparian and hyporheic zone hydrochemical dynamics. (*On demand*)

ESCI 5233. Geoenvironmental Site Characterization. (4)
Prerequisites: Earth Sciences, Geology and M.A. Geography majors: ESCI 4140 or 4155. Others require permission of the instructor. Advanced field-based examination of hydrologic and geologic conditions in the southeastern United States within the context of current state and federal regulatory requirements and site characterization activities currently performed by professional environmental geoscientists. Hydrologic investigation and water quality characterization, and geological and geophysical site investigations. *(On demand)*

ESCI 5250. Advanced Dynamic Meteorology. (3)
Prerequisites: METR 3250 and METR 3251, or instructor permission. An extension of METR 3250 to provide an in-depth examination of atmospheric dynamics, focusing on the structure and evolution of synoptic scale dynamical and convective weather systems, and atmospheric modeling. Three hours of lecture per week. *(Fall, On demand)*

ESCI 5251. Advanced Synoptic Meteorology. (3)
Prerequisites: METR 3250 and METR 3251, or instructor permission. An extension of METR 3251 sufficient to develop an integrated view of dynamic and synoptic meteorology. Included are a survey of conceptual models and analysis techniques for mesoscale atmospheric features, cumulus convection, and tropical storms. Three hours of lecture per week. *(Spring, On demand)*

ESCI 5320. Tropical Meteorology. (3) Prerequisites: METR 3245 and METR 3250, or permission of instructor. A comprehensive study of the tropical atmosphere, including climatology, mean structure and circulation, air-sea energy exchange, cumulus transport, synoptic waves, and tropical storms. Special attention is paid to the formation, evolution, motion, and societal impacts of hurricanes. Three hours of lecture per week. *(Fall, On demand)*

ESCI 5350. Mesoscale Meteorology. (3) Prerequisites: METR 3245 and METR 3250, or permission of instructor. A comprehensive study of the structure, evolution, and dynamics of atmospheric phenomena having spatial scales between 2 and 200 km. Topics include: fronts, convective initiation, mesoscale convective systems, severe thunderstorms, tornados, low-level jets, land-sea breezes, and terrain effects. Three hours of lecture per week. *(Spring, On demand)*

ESCI 5400. Internship in Earth Sciences. (3-6)
Prerequisite: permission of the Graduate Committee. Research and/or work experience designed to be a logical extension of a student's academic program. The student must apply to Graduate Advisory Committee for an internship by submitting a proposal which specifies the type of work/research experience preferred and how the internship will complement his or her academic program. The Graduate Committee will attempt to place the selected students in cooperating community organizations to complete specified research or work-related tasks which are based on a contractual arrangement between the student

and community organization. The student can receive three to six hours credit, depending on the nature and extent of the internship assignment. *(On demand)*

ESCI 5800. Individual Study in Earth Sciences. (1-4)
Prerequisite: permission of the instructor and credit hours established in advance. Tutorial study or special research problems. May be repeated for credit as topics vary. *(On demand)*

ESCI 6000. Selected Topics in Earth Sciences. (1-4)
Prerequisites: permission of the Earth Sciences Graduate Coordinator. In-depth treatment of specific topics selected from one of the concentrations in earth sciences (Solid Earth Sciences; Climatology and Hydrology; Environmental Systems Analysis). May be repeated for credit as topics vary. *(On demand)*

ESCI 6060. Earth Sciences Field Investigations. (1-6)
Prerequisite: permission of instructor. A concentrated field investigation of selected earth sciences topics. Course subject matter, credit hours, location and duration will be specified each time course is offered. May be repeated for credit. Pass/Unsatisfactory grading. *(On demand)*

ESCI 6105. Landscape Assessment. (4) Prerequisite: GEOL 4105 or permission of instructor. An advanced geomorphology class that examines current climatic and/or tectonic geomorphology research topics and methods with a focus on regional or disciplinary issues that will vary each offering. Using a variety of field-based quantitative and qualitative techniques such as laser surveys, GPS, trenching and/or coring, students will devise and implement a research project that includes two related but separate field sites. Three hours seminar per week with three or four mandatory field trips. *(On demand)*

ESCI 6201. Earth Systems Analysis: Climate. (3) Current working hypotheses and research methods are reviewed for the study of climatology and climate change. Theories and mechanisms of climate change, as well as the interrelationships between the components of the climate system, are discussed towards understanding and explaining past, present and possible future climatic behavior. *(On demand)*

ESCI 6202. Earth Systems Analysis: Biogeochemical Cycles. (3) This course examines the Earth's water and major elemental cycles including those of carbon, nitrogen, sulfur, phosphorus and the major crustal elements. Uncertainties in the current state of understanding of global elemental cycles are examined. Special emphasis is placed on how these cycles are currently being modified through human activities. *(On demand)*

ESCI 6250. Urban Air Quality. (3) Prerequisites: M.S. Earth Science, M.A. Geography, and Ph.D. INES and Public Policy students: METR 4150 and STAT 2221 or permission of instructor. Examination of the relationships between climatic processes and urban air quality with

emphasis on trends and patterns. Topics will include health and environmental effects of air pollution, ozone climatology, pollutant transport, transportation related emissions, risk assessment, and air quality management. (*On demand*)

ESCI 6301. Earth Systems Analysis: Human Interactions. (3) Current working hypotheses and research methods are reviewed for the regional and global scale coupling of categorical human activities and earth processes. The focus is on GIS-based modeling frameworks for parametric impact assessment. (*On demand*)

ESCI 6302. Earth Systems Analysis: Statistical and Risk-based Decision Support Systems. (3) Statistical and risk-based research/decision support methods are reviewed for local and regional environmental assessment and management. The focus is on parametric statistical analysis of large temporal and spatial datasets for the human-interface with the local and regional air, water and land resources. Valuation, ranking, prioritization, and indexing models for environmental management are also discussed. (*On demand*)

ESCI 6650. Workshop in Earth Sciences. (4) A series of lectures on the subject matter of the atmosphere and hydrosphere with accompanying laboratory sessions. (*On demand*)

ESCI 6800. Individual Study in Earth Sciences. (1-4) Prerequisite: permission of the instructor and credit hours established in advance. Tutorial study or special research problems. May be repeated for credit as topics vary. (*On demand*)

ESCI 6900. Earth Sciences Research. (1-9) Prerequisites: permission of the student's research advisor. Students will complete hypothesis or problem-driven research that will include formulation, implementation, analysis and presentation components. May be repeated for credit.

ESCI 7999. Master's Degree Graduate Residency Credit. (1) Permission needed from department.

Geology

GEOL 5000. Topics in Geology. (1-4) Prerequisites: ESCI 1101, GEOL 1200-1200L, or permission of the instructor. In-depth treatment of specific topics selected from one of the fields of geology. May be repeated for credit as topics vary. (*On demand*)

GEOL 5100. Igneous and Metamorphic Petrology. (4) Prerequisite: GEOL 3115. Classification, mineralogy and chemical properties of igneous and metamorphic rocks including the tectonic processes by which they formed. Lab emphasizes hand specimen and petrographic description and interpretation of rocks in thin sections. (*On demand*)

GEOL 5105. Geomorphology. (3) Prerequisite: ESCI 1101; GEOL 1200 and 1200L. Surficial processes and

landform development as controlled by climate, tectonics, rock characteristics and time with emphasis on plate tectonic, weathering, erosion, mass wasting, surface water, groundwater, glacial, wind coastal processes and climate change in landscape development. (*On demand*)

GEOL 5105L. Geomorphology Laboratory. (1) Prerequisite or corequisite: GEOL 5105. Analysis of landforms and the surficial processes responsible for landform development. One lab period of 3 hours per week. (*On demand*)

GEOL 5110. Stratigraphy. (4) Prerequisites: GEOL 1210 and 3124. Vertical and horizontal relationships of layered earth materials as a key to understanding basin history, past depositional environments and their transformation through time. Three lecture hours, three lab hours per week. (*Spring*)

GEOL 5115. Applied Geophysics. (4) Prerequisites: GEOL 3115, 3130 and introductory physics or permission of instructor. Instrumental analysis of the earth's physical parameters. Study of human-induced seismic and electrical signals, and natural magnetic and gravitational fields for the purposes of locating faults, ore bodies, ground water and other earth hazards or resources. Three hours of lecture and one two-hour lab per week. (*On demand*)

GEOL 5120. Geologic Mapping and Interpretation. (4) Prerequisites: GEOL 3130 and 5100 or permission of instructor. Field and lab oriented study using principles of mineralogy, petrology and structural geology. Involves collection and resolution of field data, techniques of presenting data, development of geologic maps, and critical reviews of existing literature. Two hours of lecture, four hours of lab/field work per week. (*Alternate years*)

GEOL 5125. Geologic Summer Field Camp. (6) Prerequisite: Permission of instructor. Concentrated field investigation of geologic features. Data collection in the field, geologic mapping, report and map preparation and time management. Location of field camp will be specified each time course is offered. (*Summer*)

GEOL 5130. Optical Mineralogy. (4) Prerequisite: GEOL 3115. Light optics theory, the behavior of plane polarized light in a solid medium. The laboratory emphasizes the use of petrographic microscope oil immersion techniques and identification of the common rock forming minerals. Three hours of lecture and one three-hour lab per week. (*On demand*)

GEOL 5135. Tectonics. (4) Prerequisite: GEOL 3130 or permission of the instructor. A systematic examination of the evolution and dynamics of the earth from the perspective of plate tectonics theory. Three lecture hours, one three-hour lab per week. (*Alternate years*)

GEOL 5140. Coastal Geology. (3) Prerequisites: GEOL 1200 and GEOL 1210 or permission of instructor. Examination of coastal environments, sediments, and wave-

related processes in the present and geologic past. Major topics considered include barrier-island and salt-marsh development, sea-level fluctuations, and the relationship between human development and natural hazards. Three hours seminar per week and one mandatory two-day field trip. (*Fall, On demand*)

GEOL 5145. Hydrogeology. (4) Prerequisites: GEOL 1200, MATH 1241, CHEM 1251 or permission of instructor. Fundamentals of groundwater hydrology. Principles of flow and transport in groundwater aquifers and the vadose zone. Topics include: storage, compressibility, capillarity, Darcy's Law, aquifer parameters, steady and transient flow equations, well hydraulics, geological controls on groundwater flow, and transport of non-reactive chemical species by advection, diffusion and dispersion in porous media. A series of experiments and problems illustrating flow and transport in porous media, together with applied problems. Three hours of lecture, and three hours of lab per week with occasional field trips. (*Spring*)

GEOL 5165. Aqueous Geochemistry. (4) Prerequisites: CHEM 1251 and 1252 and GEOL 3115, or permission of instructor. Interaction of rocks, minerals, and gases with water under natural conditions, including an overview of the compositions of natural waters from a variety of environmental and geologic settings emphasizing a rigorous thermodynamic approach to understanding water-rock interactions. Three hours of lecture, three hours of lab per week. (*On demand*)

GEOL 5175. Geochemistry. (3) Prerequisites: GEOL 1200, 1200L and Chemistry 1251 or permission of instructor. Geochemical survey of origin, evolution and present composition of the earth. (*Alternate years*)

GEOL 5175L. Geochemistry Laboratory. (1) Prerequisite or corequisite: GEOL 5175 or permission of instructor. Analytical methods and sample preparation techniques used by geochemists. One three hour meeting per week. (*On demand*)

GEOL 5185. Mineralogy, Economics and the Environment. (3) This course will focus on the origin, distribution, and consumption rate of the Earth's mineral resources. This lecture-based class will promote an understanding of not only the geologic, engineering and economic factors that govern mineral production, but also the resulting environmental pollution problems. (*Alternate years*)

GEOL 5410. Applied Soil Science. (4) Prerequisites: ESCI 4210/5210 or permission of the instructor. Students will read and discuss current literature pertaining to the application of soils to various fields of research such as surficial processes, active tectonics, ecology, stratigraphy, archaeology, and environmental assessment. Topics covered will vary depending on the interests of the students. Students will create and execute a semester-long soils-based

field or laboratory research project of their choosing. Graduate students will fulfill the requirements of GEOL 4410. In addition, graduate students will have additional writing assignments throughout the semester. Graduate students' semester project must contain both field and laboratory components. Three hours seminar, three hours field or lab each week. (*On demand*)

GEOL 6101. Earth Systems Analysis: Geodynamics. (3) Current working hypotheses and research methods are reviewed for the study of crustal and lithospheric processes on time scales from the seismic cycle to the long-term geologic evolution of basins and mountain belts and on physical scales ranging from the fracture and flow of rock masses to regional deformation and mountain building. (*On demand*)

GEOL 6102. Earth Systems Analysis: Paleo-Environments. (3) Current working hypotheses and research methods are reviewed for the study of paleo-environments. The interrelationships of tectonics, paleogeography, biogeography, and orbital climate forcing, as represented in the geologic record, are discussed and reviewed in light of modern concerns for climate change. (*On demand*)

GEOL 6103. Earth Systems Analysis: Solid Earth Geochemistry. (3) Current working hypotheses and research methods are reviewed for the study of the geochemical evolution of the Earth's continental and oceanic crust. Hypotheses regarding coupling between solid earth geochemical processes and the evolution of the Earth's atmosphere and oceans are also briefly discussed. (*On demand*)

GEOL 6651. Workshops in Geology. (4) A series of lectures on subject matter of the lithosphere and space science with accompanying laboratory sessions. (*On demand*)

GEOL 6800. Individual Study in Geology. (1-4) Prerequisite: Permission of the instructor and credit hours established in advance. Tutorial study or special research problems. May be repeated for credit as topics vary. (*On demand*)

GEOL 7999. Master's Degree Graduate Residency Credit. (1) Prerequisite: permission of department.

English

- M.A. in English
- M.A. in English Education
- Graduate Certificate in Technical/Professional Writing

Department of English

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Coordinator

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Cy Knoblauch, Professor
Jeffrey Leak, Associate Professor
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James Holt McGavran, Jr., Professor
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Anita Moss, Professor
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Aimee Parkison, Assistant Professor
Malin Pereira, Chair and Professor
Alan Rauch, Associate Professor
Anthony Scott, Associate Professor
Daniel Shealy, Professor
Ralf Thiede, Associate Professor
Aaron Toscano, Assistant Professor
Lara Vetter, Assistant Professor
Mark I. West, Professor
Greg Wickliff, Associate Professor

MASTER OF ARTS IN ENGLISH

The master's program in English is designed to accommodate a wide variety of students: those seeking personal enrichment through increased knowledge and understanding; those preparing to pursue a Ph.D. in English or other advanced professional degrees; and those seeking professional advancement in such fields as writing, publishing, or teaching on the primary, secondary, or

college levels. The Department offers a broad range of courses in literature, writing/rhetoric, and language, including second language studies and applied linguistics. The Department offers five M.A. emphases: Literature, Composition/Rhetoric, Creative Writing, Applied Linguistics, and English for Specific Purposes; in addition, it offers M.A. concentrations in Children's Literature and Technical/Professional Writing.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for study in English:

- 1) Thirty hours of undergraduate coursework in English beyond the first-year level, or evidence of equivalent academic preparation for graduate study in English, as approved by the Department.
- 2) A satisfactory score on the Aptitude portion of the Graduate Record Examination or on the Miller Analogies Test.

Degree Requirements

The program requires a minimum of 36 semester hours of graduate credit with grades of A or B. (A course in which a graduate student receives a grade of C is not allowable as part of the 36 required hours.) At least 18 semester hours must be in English courses at the 6000-level, open only to graduate students. A student must choose an emphasis or concentration from the following offerings:

- Emphases: Literature, Composition/Rhetoric, Creative Writing, Applied Linguistics, English for Specific Purposes
- Concentrations: Children's Literature, Technical/Professional Writing

Note: While concentrations are reflected on students' transcripts, emphases are not.

Courses beyond 36 hours of graduate credit may be required to remove deficiencies or to satisfy requirements for graduate licensure, or may be recommended to develop areas of need, to pursue particular interests, or to gain specific experience.

Of the 36 hours of graduate credit, 30 must be in English courses; the remaining 6 hours may be taken in English or in another discipline. If the hours are to be taken outside of English, the student must submit a written request to the Coordinator of Graduate Studies, explaining how these hours will enrich his/her program.

No more than 6 hours of ENGL 6890 (Directed Reading), may be applied to the degree without written permission of the Chair of the Department. (This does not apply to a Directed Reading for an M.A. Project.)

Assistantships

A number of graduate assistantships are available each year. Applications must be submitted by March 15 for

assistantships beginning the following academic year. Further information is available in the Department.

Internships

ENGL 5410. The Department of English offers a number of internships for graduate students (limited to 3 hours of credit), which provide program-related experience in local television and radio stations, non-profit and government agencies, and local businesses and corporations. Further information is available in the Department.

Advising

The English Graduate Coordinator and other graduate faculty members acting as his/her designated assistants will advise graduate students.

Licensure

For information on licensure in English, please see the requirements of the M. A. in English Education program. For information on licensure to teach English to non-native speakers, see the requirements for the M.A. in Teaching English as a Second Language.

Master's Thesis

The M.A. thesis is optional; it may be either scholarly or creative. Students who choose to write a thesis will consult with the Coordinator of Graduate Studies in English, who will appoint a thesis committee comprising a director and two faculty readers. For more information on the M.A. Thesis, see the course description for ENGL 6996.

Tuition Waivers

Each year, at least one out-of-state tuition waiver is available for a new graduate assistant. In-state tuition waiver funds are also available for new graduate assistants and sometimes for other outstanding applicants.

Core Courses

All M.A. candidates, regardless of which concentration or emphasis is chosen, are required to take ENGL 6101 (Introduction to English Studies) and ENGL 6160 (Introduction to the English Language).

Emphasis and Concentration Descriptions

Literature Emphasis

The literature faculty are committed to teaching a variety of national and ethnic literatures in English, including British, American, and Anglophone literatures. The literature emphasis requires a total of 36 hours with courses meeting the following requirements: five literature courses of which three must be historically oriented, two must be in one national literature and another must be in a different national literature, and one must be in literature written before 1800. In addition, students must take one writing/rhetoric course and one literary theory-intensive course and electives to bring the total number of hours to thirty-six.

Required Comprehensive Examination in the Literature Emphasis

All students in the literature emphasis must satisfactorily complete a written examination based on a reading list proposed by the student and approved by the Graduate Committee. Information about this list is available in the Department office. The written examination may not be attempted sooner than the last semester of coursework, exclusive of thesis credits. This examination procedure will be implemented for students entering the program in Fall of 2009 and thereafter.

Master's Thesis

The M.A. thesis is optional; it may be either scholarly or creative. For descriptions of the Master's thesis, see "Master's Thesis" above and the course description for ENGL 6996. Students electing the thesis option will use the six hours of thesis credit to replace one elective and another course, chosen in consultation with the English Graduate Coordinator.

Composition/Rhetoric Emphasis

The field of rhetoric and composition prepares students comprehensively in the theory, practice, and teaching of written public discourse. Our program introduces research in the language arts, from the ancient rhetoric of Greece and Rome to modern theories of the composing process, while also emphasizing practical preparation in the teaching of writing and the administration of composition programs, writing centers and writing across the curriculum programs.

The Composition/Rhetoric emphasis includes five composition/rhetoric courses, one of which is composition/rhetoric theory-intensive; two literature courses; and two elective courses. The Composition/Rhetoric emphasis may focus on rhetorical theory, composition theory, or writing and pedagogy.

Project/Thesis

All students in the Composition/Rhetoric emphasis must submit either a project or a thesis to satisfy requirements for the degree.

Project

Students electing to submit a project to satisfy this requirement will enroll in a three-hour directed reading (ENGL 6890) leading to the production of a project. [*Note: see the Coordinator of Graduate Studies in English for details on the requirements for this project.*]

Master's Thesis

The M.A. thesis is optional; it may be either scholarly or creative. For descriptions of the Master's thesis, see "Master's Thesis" above and the course description for ENGL 6996. Since the thesis carries six hours of credit, students electing the thesis option will take only one elective course.

Creative Writing Emphasis

The aim of this emphasis is to enable students to develop their abilities as creative writers through writing practice in more than one genre and through the creatively-engaged study of literature.

The Creative Writing emphasis includes one theory-intensive course (in writing or literature), two literature courses, and:

- One course selected from the following:
 - ENGL 5203 Writing Fiction
 - ENGL 5209 Fiction Writing Workshop
- One course selected from the following:
 - ENGL 5202 Writing Poetry
 - ENGL 5208 Poetry Writing Workshop
- Two 6070 Topics in English courses (must be creative writing topics)
- Two electives (with the approval of the Coordinator of Graduate Studies in English)

[Note: It is possible for elective hours to be applied to additional creative writing courses, if the student wishes to repeat any of the fiction or poetry courses listed above in order to receive additional instruction in his or her chosen genre.]

Project/Thesis

All students in the Creative Writing emphasis must submit either a project or a thesis to satisfy requirements for the degree.

Project

Students electing to submit a project to satisfy this requirement will enroll in a three-hour directed readings (ENGL 6890) leading to the production of a project. *[Note: see the Coordinator of Graduate Studies in English for details on the requirements for this project.]*

Master's Thesis

The M.A. thesis is optional; it may be either scholarly or creative. For descriptions of the Master's thesis, see "Master's Thesis" above and the course description for ENGL 6996. Since the thesis carries six hours of credit, students electing the thesis option will take only one elective course.

Applied Linguistics Emphasis

Linguistics is a broad field, and the applied linguistics emphasis offers students the opportunity to apply linguistic concepts to a broad range of endeavors, including the teaching of writing, adult English language instruction, and various types of textual analyses.

The Applied Linguistics emphasis includes two writing/rhetoric courses, two literature courses, and:

- ENGL 6127 Seminar in Language, Culture and Society
- ENGL 6161 Introduction to Linguistics
- ENGL 6163 Language Acquisition

In addition, students will choose two courses from the following:

- ENGL 5050 Topics in English (Linguistics topic; must be approved by the English Graduate Coordinator)
- ENGL 5254 Teaching English/Communications Skills to Middle and Secondary School Learners
- ENGL 6070 Topics in English (Linguistics topic; must be approved by the English Graduate Coordinator)
- ENGL 6162 History of the English Language
- ENGL 6164 Comparative Language Analysis for Teachers
- ENGL 6165 Introduction to English for Specific Purposes
- ENGL 6167 Research Methods in Applied Linguistics

Project/Thesis

All students in the Applied Linguistics emphasis must submit either a project or a thesis to satisfy requirements for the degree.

Project

Students electing to submit a project to satisfy this requirement will enroll in a three-hour directed reading (ENGL 6890) leading to the production of a project. *[Note: see the Coordinator of Graduate Studies in English for details on the requirements for this project.]*

Master's Thesis

The M.A. thesis is optional; it may be either scholarly or creative. For descriptions of the Master's thesis, see "Master's Thesis" above and the course description for ENGL 6996. Since the thesis carries six hours of credit, students electing the thesis option will take only one course from the optional courses listed above. *[Note: students will consult with the Coordinator of Graduate Studies in English, who must approve their choice of which course to take from this list.]*

English for Specific Purposes Emphasis

Certified English for Specific Purposes teachers are prepared to teach adult learners in community colleges, in-company training courses, and in English language institutes at the university level, both in the U.S. and internationally. The English for Specific Purposes emphasis includes three required courses:

- ENGL 6165 Intro to English for Specific Purposes
- ENGL 6167 Research Methods in Applied Linguistics
- ENGL 6168 Practicum in English for Specific Purposes

In addition, students will choose four electives from the following:

- ENGL 5050 Language and the Professions
- ENGL 6070 Topics in English (*Linguistics topic; must be approved by the English Graduate Coordinator*)
- ENGL 6127 Seminar in Language, Culture and Society
- ENGL 6161 Introduction to Linguistics for Teachers

ENGL 6162 History of the English Language
ENGL 6163 Language Acquisition

Students must select two electives for which approval of the English Graduate Coordinator is required.

Portfolio/Thesis

All students in the English for Specific Purposes emphasis must submit either a portfolio or a thesis to satisfy requirements for the degree.

Portfolio

Students electing to submit a portfolio to satisfy this requirement will enroll in a three-hour directed readings (ENGL 6890) leading to the production of a portfolio. [Note: see the Coordinator of Graduate Studies in English for details on the requirements for this portfolio.]

Master's Thesis

The M.A. thesis is optional; it may be either scholarly or creative. For descriptions of the Master's thesis, see "Master's Thesis" above and the course description for ENGL 6996. Since the thesis carries six hours of credit, students electing the thesis option will take only one three-hour elective course.

Technical/Professional Writing Concentration

Students accepted into the M.A. in English program may elect a concentration in Technical/Professional Writing. This concentration will be designated on the student's transcript. The curriculum includes courses that 1) provide students with an understanding of the theoretical and rhetorical foundation of the field, 2) introduce students to the methods and results of research in the field, 3) offer students an opportunity to practice theory and research through project work for clients, 4) address technology and science as socially-constructed disciplines, and 5) help students build skills in written and oral communication, project management, and teamwork.

Required courses include:

ENGL 5180 Theories of Technical Communication
ENGL 5410 Professional Internship
ENGL 6116 Technical/Professional Writing (*this class should be taken in the first year*)
ENGL 6166 Rhetorical Theory

In addition, students will choose at least three courses from the following:

ENGL 5008 Topics in Advanced Technical Communication (*may be repeated for credit*)
ENGL 5181 Writing and Designing User Documents
ENGL 5182 Information Design & Digital Publishing
ENGL 5183 Editing Technical Documents
ENGL 6008 Topics in Advanced Technical Communication (*may be repeated for credit*)

Lastly, students will choose two elective courses. [Note: the permission of the English Graduate Coordinator is needed for courses outside the Department of English.]

Project/Thesis

All students in the Technical/Professional Writing concentration must submit either a project or a thesis to satisfy requirements for the degree.

Project

Students electing to submit a project to satisfy this requirement will enroll in a three-hour directed readings (ENGL 6890) leading to the production of a project. [Note: see the English Graduate Coordinator for details on the requirements for this project.]

Master's Thesis

The M.A. thesis is optional; it may be either scholarly or creative. For descriptions of the Master's thesis, see "Master's Thesis" above and the course description for ENGL 6996. Since the thesis carries six hours of credit, students electing the thesis option will take only one three-hour elective course.

Children's Literature Concentration

This concentration is premised on the assumptions that children's literature is an integral part of many literary traditions and that students studying children's literature should develop an understanding of the connection between children's literature and other forms of literature. Students will take two courses in literature (other than Children's literature), two courses in writing/rhetoric, and:

ENGL 6103 The Worlds of Juvenile Literature

12 hours selected from:

ENGL 5050 Topics in English (Children's Literature topics)
ENGL 5102 Classics in British Children's Literature
ENGL 5103 Classics in American Children's Literature
ENGL 5104 Multiculturalism and Children's Literature
ENGL 6070 Topics in English (Children's Literature Winners)
ENGL 6104 Major Figures in Children's Literature
ENGL 6890 Directed Reading
ENGL 6996 Thesis (6 hours)
READ 6100 Current Issues and Practices in Literacy
EDUC 5000 Topics in Education (topics that relate to Children's Literature)

Comprehensive Examination/Thesis

All students in the children's literature concentration must satisfactorily complete either a written examination or a Master's thesis.

Comprehensive Examination

Students electing this option will satisfactorily complete a written examination based on a reading list proposed by the student and approved by The English Graduate Committee. Information about this list is available in the Department

office. The written examination may not be attempted sooner than the last semester of coursework, exclusive of thesis credits. *[Note: This examination procedure will be implemented for students entering the program in Fall of 2009 and thereafter.]*

Master's Thesis

The M.A. thesis is optional; it may be either scholarly or creative. For descriptions of the Master's thesis, see "Master's Thesis" above and the course description for ENGL 6996. Students electing the thesis option will use the six hours of thesis credit to replace the elective course and another course as approved by the English Graduate Coordinator.

MASTER OF ARTS IN ENGLISH EDUCATION

Designed for experienced middle and secondary English teachers, the M.A. in English Education qualifies graduates for the new Master's/Advanced Competencies "M" license in English Education. The program includes core courses team-taught by faculty in the English Department and the College of Education which focus on issues in the teaching of English and on research methods and advanced study in English and professional education, including a core course in teacher leadership.

Aligned with the 1997 North Carolina Excellent Schools Act and the proposition of the National Board for Professional Teaching Standards, the program prepares graduates to become master teachers who are (1) self-directed in their personal and professional growth as educators, (2) responsive to children's differences influenced by development, exceptionalities, and diversity, (3) well-grounded in the content and pedagogy of English/Language Arts curriculum, (4) self-reflective, self-evaluative, educational researchers, and (5) collaborative leaders.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, applicants must:

- 1) hold the "A" license in Secondary English or Middle Grades Language Arts from the North Carolina Department of Public Instruction (or its equivalent from another state),
- 2) have at least two years experience of full-time teaching in the secondary or middle grades classroom,
- 3) have an undergraduate GPA of 2.75 overall and 3.0 in the junior/senior years and thirty hours of undergraduate course work in English beyond the freshman level, or evidence of equivalent academic preparation,
- 4) submit a satisfactory essay that provides a statement of purpose for Master's degree study.

Degree Requirements

The M.A. in English Education Program requires completion of at least 38 semester hours of graduate credit with grades of A or B in approved courses including:

Core Course Requirements (14 hours)

- ENGL/EDUC 6274 Contexts and Issues in the Teaching of English (4)
- ENGL/EDUC 6674 Applied Research Methods in the Teaching of English (4)
- ENGL/EDUC 6974 Thesis/Project in the Teaching of English (6)

Professional Requirements (12 Hours)

- MDSK 6260 Principles of Teacher Leadership (3)

Also, 9 additional hours of graduate-level Education courses selected in consultation with the Program Coordinator. The program's 9 hours of professional courses are not free electives, but a planned program of study identified upon the students' enrollment in the program as part of the students' overall professional and program plan.

Content Specialization Requirements (12 Hours)

12 hours of graduate-level English courses selected in consultation with the Program Coordinator. The program's 12 hours of content specialization courses are not free electives, but a planned program of study identified upon the students' enrollment in the program as part of the students' overall professional and program plan.

At least 18 hours of course work in the program must be in English or Education courses at the 6000 level.

Assistantships

Assistantships are awarded on a competitive basis through the Department of English and the Department of Middle Grades, Secondary, and K-12 Education.

Capstone Experience

Students are required to complete a Master's Thesis/Project, a formal piece of scholarship that investigates a particular problem in English education and attempts to provide either data-based practical solutions to the problem or a philosophical/theoretical exploration of the problem and its implications for the classroom. Following the approval from the student's thesis committee, the candidate must present the findings in a professional manner at a level expected of a master teacher.

Licensure

The M.A. in English Education qualifies graduates for the Master's/Advanced Competencies "M" license in English Education.

GRADUATE CERTIFICATE IN TECHNICAL/PROFESSIONAL WRITING

The University of North Carolina at Charlotte offers a Graduate Certificate Program in Technical/Professional Writing designed for post-baccalaureate, graduate, and post-graduate students. Students can complete the required 21 graduate credit hours in approximately two years. Students will learn to design information, use hypermedia tools, create on-line support systems, design visuals, develop web pages, manage publications and projects, work with clients, develop portfolios, and learn page layout, graphics, and other software applications.

Admission Requirements

Students must apply for admission to the graduate school and must have a minimum undergraduate GPA of 2.75. Applicants will be required to submit: 1) a current GRE score; 2) a current MAT score; or 3) a portfolio of professional documents. Only graduate courses taken at UNC Charlotte will count towards this Graduate Certificate.

Certificate Requirements (9 hours)

- ENGL 6116 Technical/Professional Writing
- ENGL 5180 Theories of Technical Communication
- ENGL 5410 Professional Internship

Electives (12 hours)

- ENGL 5181 Writing & Designing User Documents
- ENGL 5182 Information Design & Digital Publishing
- ENGL 5183 Editing Technical Documents
- ENGL 5008 Topics in Technical Communication
- ENGL 6008 Topics in Advanced Technical Communication

Other Courses: as appropriate and approved by the Department

COURSES IN ENGLISH

ENGL 5002. Women and Literature. (3) Selected topics focusing on women and literature, such as images of women, women as writers, and women as literary critics. With permission of the English Department, may be repeated for credit as topics vary. (However, only six hours may be used for the requirements for the English major.) *(On demand)*

ENGL 5008. Topics in Advanced Technical Communication. (3) Exploration, both theoretically and practically, of the interrelation of written, oral, graphic, and digital communication within technical rhetorical contexts. May be repeated once for additional credit with approval of the English Department. *(On demand)*

ENGL 5050. Topics in English. (3) Special topics not included in other courses. May be repeated for additional credit with approval of the English Department. *(On demand)*

ENGL 5090. Major Authors. (3) The works, ideas and life of one to three significant authors. With permission of the English Department, may be repeated once for credit as long as different authors are studied. *(On demand)*

ENGL 5102. Classics in British Children's Literature. (3) Focuses on pivotal works in the history of British and British Colonial Children's Literature. *(Fall)*

ENGL 5103. Classics in American Children's Literature. (3) Focuses on pivotal works in the history of American Children's Literature. *(Spring)*

ENGL 5104. Multiculturalism and Children's Literature. (3) Focuses on works that represent one or more kinds of cultural, ethnic, or social diversity of the United States and other national literatures. *(Fall)*

ENGL 5114. Milton. (3) A study of the major poems and selections from the minor works of Milton. *(On demand)*

ENGL 5116. Shakespeare's Early Plays. (3) A study of 10 representative plays from the comedies, histories and tragedies written 1590-1600. *(Yearly)*

ENGL 5117. Shakespeare's Late Plays. (3) A study of 10 representative plays from the period 1600-1611, including the late tragedies and tragi-comedies. *(Yearly)*

ENGL 5121. The 18th-Century British Novel. (3) The novel as narrative form and as mirror of the individual in society. Emphasis on fiction by Defoe, Richardson, Fielding, Sterne, Austen, with further readings in the novel of manners and the Gothic romance. *(On demand)*

ENGL 5122. The Victorian Novel. (3) Readings in British fiction during the triumph of the novel in the 19th century, emphasizing major developments in realism, romance, naturalism. *(On demand)*

ENGL 5123. The Modern British Novel. (3) Representative British novels that embody the cultural and literary developments of the 20th century: the impact of two world wars, the influence of important psychological and economic factors of modern life and their relationships to new techniques in art and literature. *(On demand)*

ENGL 5124. Modern Irish Literature. (3) Readings in Irish literature since 1885, with consideration of the mythology, folklore, and social history of Ireland as they are expressed in poetry, drama and fiction. *(On demand)*

ENGL 5131. British Drama to 1600, Excluding Shakespeare. (3) A survey of the development of British

drama to 1600, with representative plays from the Mystery-Miracle Cycles, the Morality Plays, and Tudor drama, including Lyly, Kyd, Marlowe, Peele, Greene, Dekker. *(On demand)*

ENGL 5132. British Drama from 1600-1642, Excluding Shakespeare. (3) A survey of Jacobean and Caroline drama, including plays by Jonson, Beaumont and Fletcher, Webster, Middleton, Shirley, Ford. *(On demand)*

ENGL 5133. British Drama of Wit and Intrigue, 1660-1780. (3) The famous bawdy comedy of manners and the heroic drama of the Restoration, followed by the sentimental comedy and satiric burlesque of the 18th century. *(On demand)*

ENGL 5143. The American Novel of the 19th Century. (3) Major novelists and traditions from the beginnings of the American novel through the rise of realism, including such novelists as Hawthorne, Melville, Twain, Howells, James. *(On demand)*

ENGL 5144. The American Novel of the 20th Century. (3) Major novelists and traditions from the emergence of naturalism to the present, including such novelists as Crane, Dreiser, Hemingway, Faulkner. *(Yearly)*

ENGL 5145. Literature of the American South. (3) Selected works of Southern writers which reflect literary and cultural concerns from Colonial times to the present, including such authors as Poe, the early humorists, local color writers, Chopin, Faulkner, Warren, O'Connor, Welty. *(Yearly)*

ENGL 5146. Contemporary Jewish-American Literature. (3) An introduction to the scope and shape of the contemporary Jewish-American literary traditions. Such writers as Bellow, Malamud, Roth, Singer, and Potok will be studied. *(On demand)*

ENGL 5147. Early Black American Literature. (3) Prerequisite: ENGL 2301. A survey of significant writings by black Americans before the Harlem Renaissance. *(On demand)*

ENGL 5148. Twentieth-Century Black American Literature: Prose. (3) Intensive study of selected black American 20th-century writers of fiction and nonfiction, beginning with the Harlem Renaissance. *(On demand)*

ENGL 5150. Contemporary Poetry. (3) Poetry in English (including translations) since 1940. *(On demand)*

ENGL 5151. Modern Drama. (3) Representative Continental, British, and American plays, from Shaw to the present. *(On demand)*

ENGL 5152. Modern European Literature. (3) Selected modern European authors, translated into English, whose

works have been of special interest to readers and writers of British and American literature. *(On demand)*

ENGL 5153. Contemporary Fiction. (3) Selected present-day fiction, with an emphasis upon works from outside the United States and Britain. Works not originally in English will be studied in translation. *(On demand)*

ENGL 5155. Pan-African Literature. (3) Introduction to significant Pan-African literature, emphasizing the oral tradition, selected works of major authors in the Caribbean and Africa, and the relationships of these traditions to American, British and other literary traditions. Works not originally written in English will be studied in translation. *(On demand)*

ENGL 5156. Gender and African American Literature. (3) Cross-listed as AFRS 4106. Prerequisite: ENGL 2301, 3100 and 3200, or permission of instructor or graduate status. Exploration of the intersection of gender and African American Literature, focusing on either Black women writers or Black male writers, or a combination in dialogue. *(On demand)*

ENGL 5157. African American Poetry. (3) Cross-listed as AFRS 4107. Prerequisites: ENGL 2301, 3100 and 3200, or permission of instructor or graduate status. Intensive study of African American poetry, focusing on one period or traversing several. *(On demand)*

ENGL 5158. African American Literary Theory and Criticism. (3) Cross-listed as AFRS 4108. Prerequisites: ENGL 2301, 3100 and 3200, or permission of instructor or graduate status. History of an African American approach to literary analysis, including a practicum in modern criticism. *(On demand)*

ENGL 5161. Modern English Grammar. (3) A study of the structure of contemporary English, with an emphasis on descriptive approaches. *(On demand)*

ENGL 5165. Language and Culture. (3) Readings in and discussion and application of the interrelationships between language and culture, including basic introduction to contemporary American dialects and to social contexts of language. *(Yearly)*

ENGL 5166. Comparative Language Studies for Teachers. (3) Prerequisite: ENGL 3132, or ENGL 6161, or permission of the Department. An introductory course designed to aid the teacher of English as a Second Language in comparing the systems of sound and structure of another language with those systems in English. *(Yearly)*

ENGL 5167. The Mind and Language. (3) Introduction to the study of the mind from a linguistic perspective. Topics include language growth and loss, language deficits, modularity and hierarchical processing, the interaction of cognitive and linguistic faculties, parsing/processing

strategies and limitations and applications such as therapy, forensics, computing, teaching. *(On demand)*

ENGL 5180. Theories of Technical Communication. (3) Rhetorical, psychological, and anthropological theories that underscore the interrelations of written graphic, and digital communication within technical, rhetorical contexts. *(Fall)*

ENGL 5181. Writing and Designing User Documents. (3) Researching and analyzing audiences to write publishable instructions. This includes the production, testing, and revision of tutorials, reference manuals, online documents, and digital media for users of computers and other technologies. *(Spring)*

ENGL 5182. Information Design and Digital Publishing. (3) Theoretical and practical exploration of visual communication. By rhetorically integrating text and graphics, students will write and publish documents and online content for digital environments. *(Fall)*

ENGL 5183. Editing Technical Documents. (3) Substantive editing, copyediting, project management, and editing in hardcopy documents and web and digital environments. *(Spring)*

ENGL 5202. Writing Poetry. (3) Prerequisite: ENGL 2126, or graduate status, or permission of instructor. Further study of and practice in the writing of poetry within a workshop format. May be repeated once for credit with the permission of the English Department. *(Yearly)*

ENGL 5203. Writing Fiction. (3) Prerequisite: ENGL 2126, or graduate status, or permission of instructor. This course provides further study of and practice in the writing of fiction within a workshop format. May be repeated once for credit with the permission of the English Department. *(Yearly)*

ENGL 5204. Expository Writing. (3) Writing of essays, criticism and various forms of exposition. *(Yearly)*

ENGL 5205. Advanced Expository Writing. (3) Prerequisite: ENGL 5204. May be repeated once for credit with permission of the English Department. *(On demand)*

ENGL 5208. Poetry Writing Workshop. (3) Prerequisite: ENGL 5202. Designed for advanced writers of poetry. Focuses primarily on student work and peer criticism of it. May be repeated once for credit with permission of department. *(Yearly)*

ENGL 5209. Fiction Writing Workshops. (3) Prerequisite: ENGL 5203. Designed for advanced writers of fiction. Focuses primarily on student work and peer criticism of it. May be repeated once for credit with permission of department. *(Yearly)*

ENGL 5210. Greek and Roman Drama in Translation. (3) A study of selected plays of Aeschylus, Sophocles, Euripides,

Aristophanes, Plautus, Terence, and Seneca with emphasis on dramaturgy and the development of the Greek and Roman theater. *(On demand)*

ENGL 5211. Chaucer. (3) The poetry of Geoffrey Chaucer, including the Canterbury Tales and Troilus and Criseyde. *(On demand)*

ENGL 5251. Literary Criticism Through Arnold. (3) The major schools and critics of literary criticism. *(On demand)*

ENGL 5252. Modern Literary Criticism. (3) Theories of the modern schools of criticism. *(On demand)*

ENGL 5254. Teaching English/Communications Skills to Middle and Secondary School Learners. (1-3) Approaches to the teaching of English, including recent theories and research related to writing and literary study, designed primarily for teaching in grades 6-12. *(Yearly)*

ENGL 5260. History of the English Language. (3) Origins and development of the English language, both spoken and written, from its earliest forms to contemporary usage. *(On demand)*

ENGL 5263. Linguistics and Language Learning. (3) Readings in, discussions of, and application of linguistically oriented theories of language acquisition, directed toward gaining an understanding of language-learning processes and stages. *(Yearly)*

ENGL 5264. Literacy in Family and Community. (3) Exploration of literacy issues and outreach in schools, agencies, and work sites. *(On demand)*

ENGL 5290. Advanced Creative Project. (3) Prerequisite: ENGL 5208 or 5209 or permission of the instructor. The planning, writing, and polishing of a work of at least 20 pages of poetry or at least 40 pages of fiction or creative non-fiction with the guidance of a member of the Department's creative writing faculty. The final work may be a single piece or a collection of pieces and will evolve under the supervision of the primary instructor. With permission of the Department, students who took the course as undergraduates may repeat as graduate students. *(On demand)*

ENGL 5400. English Composition Practicum. (1-3) Prerequisite: permission of the instructor. Through supervised tutorial experience and seminars, this course introduces the student to current developments concerning composition and to a variety of methods for teaching English composition. This course is highly recommended for teachers and those planning to teach. With permission of the English Department may be repeated once for credit. *(Yearly)*

ENGL 5410. Professional Internship. (3 or 6) Prerequisites: permission of English Internship Coordinator. Restricted to juniors, seniors, graduate students majoring in

English or minoring in English or communications who have at least a 2.5 GPA and a course in professional communication (e.g., journalism, technical communication, public relations, public relations lab, or mass media). Students work 8-10 hours (3 hours credit) or 16-20 hours (6 hours credit) per week in a placement arranged by the Internship coordinator. Only three credit hours may be applied to the English major at either the undergraduate or graduate level; three additional hours may be counted as a University or Communications elective. (*Fall, Spring, Summer*)

ENGL 5852. Independent Study. (1-3) Prerequisite: permission of the department. Individual investigations and appropriate exposition of the results. (Unless special permission is granted by the Department Chair, no more than six hours may apply toward the English major.) May be repeated for additional credit with approval of the English Department. (*Fall, Spring, Summer*)

ENGL 6008. Topics in Advanced Technical Communication. (3) Theoretical and practical exploration of advanced topics in technical communication, including projects in which students write and publish documents by rhetorically integrating text, graphics, and other media using computer aids. (*Yearly*)

ENGL 6062. Topics in Rhetoric. (3) Examination of and/or research concerning selected issues in rhetorical theory or pedagogy. May be repeated for credit with English Department approval. (*Yearly*)

ENGL 6070. Topics in English. (3) Selected topics of literature, rhetoric/writing, and language. May be repeated for credit as topics vary and with English Department approval. (*Fall, Spring*)

ENGL 6101. Introduction to English Studies. (3) The discipline of English--its nature, its history, and its methods. Emphasis on (1) the interrelations of literature, language, and writing; and (2) the diversity of cultural origins and critical perspectives in English studies, with concentration on selected major critical approaches. Intensive writing and practice in methods of research. Required of all M.A. in English students, preferably at or near the beginning of their programs. (*Fall, Spring*)

ENGL 6102. Literary Theory. (3) Modern literary theory focusing on the theoretical concepts which underpin literary analysis. Emphases may differ from semester to semester; readings will focus on major theoretical statements and on criticism which applies several approaches to particular literary works. Students will be required to apply what they have learned. (*On demand*)

ENGL 6103. The Worlds of Juvenile Literature. (3) Covers a range of literature for children and adolescents including both historical and contemporary works. (*Yearly*)

ENGL 6104. Major Figures in Children's Literature. (3) Focuses on specific authors or illustrators who have made important contributions to the evolution of children's literature. (*On demand*)

ENGL 6111. Shakespeare's Comedies and Histories. (3) Source materials, textual problems and stage conventions in selected comedies and history plays illustrating Shakespeare's dramaturgy. (*Yearly*)

ENGL 6112. Shakespeare's Tragedies. (3) Source materials, textual problems and stage conventions of the great tragedies, illustrating Shakespeare's dramaturgy. (*Yearly*)

ENGL 6113. Milton. (3) The complete poetry and selections from the prose. (*On demand*)

ENGL 6116. Technical/Professional Writing. (3) Prerequisite: Graduate or Post-Baccalaureate Graduate standing. An introduction to the theoretical and practical exploration of key issues and developments in the field of technical/professional writing. Students will write and publish print and online documents by rhetorically integrating text and graphics. Students in the Technical/Professional Writing Concentration are expected to enroll in 6116 as their first or second course in the program. (*Fall*)

ENGL 6123. The Augustan Age, 1660-1785. (3) Close reading of Dryden, Pope, Swift, Johnson, and a consideration of other literary figures and trends, in the light of intellectual and historical currents. (*On demand*)

ENGL 6125. The Romantic Era, 1785-1832. (3) Development of the Romantic movement, with emphasis on the works of Wordsworth, Coleridge and other major poets. (*On demand*)

ENGL 6126. The Victorian Era, 1832-1900. (3) Emphasis on Tennyson, Robert Browning, Arnold, Carlyle, Ruskin, Newman. (*On demand*)

ENGL 6127. Seminar in Language, Culture, and Society. (3) Recommended prerequisite: an introductory course in linguistics. Discussions on topics such as the complex relationships between language and culture, how language affects perception and cognition, and how language affects the individual's sense of self and the group's sense of community. (*On demand*)

ENGL 6141. American Romanticism. (3) Major writers of the 1830s, 40s, and 50s, including Hawthorne, Melville, Whitman, Emerson, Thoreau, and the Transcendental Movement. (*On demand*)

ENGL 6142. American Realism and Naturalism. (3) Major writers of the two movements before and after the end of the 19th century, including Twain, Howells, James, Crane, Dreiser, Norris. (*On demand*)

ENGL 6143. American Modernism. (3) Six to eight writers of the period since World War I, both prose and poetry. (*On demand*)

ENGL 6144. Stylistics. (3) Methodologies for analysis of the style of texts, with special emphasis on diction, syntax, prose, rhythm, voice, and metaphor. (*On demand*)

ENGL 6147. Perspectives in African-American Literature. (3) A survey of African-American literature, emphasizing the major authors, those relevant historical and social factors, and those specific literary movements that have influenced the development of African-American literature. (*On demand*)

ENGL 6160. Introduction to the English Language. (3) History and nature of English, its grammar, syntax, and lexicon. Integrates the study of language-based rhetorical and literary theory, asks students to consider the nature of language in general, its impact on the user, and the development of the systems of English, concentrating on features of major British and American dialects and registers. Required of all M.A. in English students, preferably at or near the beginning of their programs. (*Fall, Spring*)

ENGL 6161. Introduction to Linguistics. (3) Introduction to linguistics, its techniques and objectives, descriptive and historical approaches, language families, language and culture. (*Yearly*)

ENGL 6162. History of the English Language. (3) Origins and development of spoken and written English, from its earliest forms to contemporary usage, with some attention to dialects and lexicography. (May not also receive credit for ENGL 4260.) (*On demand*)

ENGL 6163. Language Acquisition. (3) Prerequisite: ENGL 6160 or permission of the instructor. Linguistic theories of first and second language acquisition, including processes and stages of language development. (May not also receive credit for ENGL 4263.) (*Yearly*)

ENGL 6164. Comparative Language Analysis for Teachers. (3) The course is an introduction to the theory and practice of contrastive language analysis. In this course students will examine universal features of the process of second language acquisition and the effects of a learner's first language on the acquisition of a second language, and explore how teachers can use such knowledge to facilitate the learner's acquisition of a second language. (*Yearly*)

ENGL 6165. Introduction to English for Specific Purposes. (3) The course is an introduction to learner-centered approaches to teaching English as a second language (ESL) and English as a foreign language (EFL) to non-native learners who need to learn English for a very definite academic, professional or vocational purpose. (*Yearly*)

ENGL 6166. Rhetorical Theory. (3) Rhetorical theories, past and present, focusing on ways that these varied frameworks of understanding have informed the generation, understanding, and pedagogy of writing and other modes of discourse. Emphases will vary from semester to semester, readings will concentrate on major selected rhetorical theories and on implications of these theories for the understanding and pedagogy of discourse. (*Yearly*)

ENGL 6167. Research Methods in Applied Linguistics. (3) Prerequisite: ENGL 6161 or permission of the instructor. The course is an introduction to the major components of designing and carrying out a research project in applied linguistics. (*Yearly*)

ENGL 6168. Practicum in English for Specific Purposes. (3) Prerequisite: permission of the Graduate Coordinator. The course provides supervised experiences in teaching in an educational setting outside the public schools with an emphasis on developing skills as an education professional. (*Yearly*)

ENGL 6195. Teaching College English. (3) Examination of major issues in the theory and practice of literature and composition instruction at the college level. (*Yearly*)

ENGL 6274. Contexts and Issues in the Teaching of English. (4) Prerequisite: Admission to the Program. In this course, students will examine the key concepts of the discipline. In doing so, they will consider their own identities as readers, writers, teachers, researchers, and makers of meaning. This course will emphasize critical approaches and pedagogical issues, with special attention given to technology in the teaching of language, composition, and literature, as well as cultural contexts for the study of English. (*Fall*)

ENGL 6495. Internship in College Teaching. (3) Prerequisite: ENGL 6195. Teaching in one section offered by the English Department under the supervision of English faculty. Students will be accepted for internship only near the end of the degree program and upon approval of the Department. Students will be assigned to teach selected basic courses, and also will participate in periodic conferences and seminars. It is strongly recommended that students also take ENGL 4400 before ENGL 6195. (*Spring*)

ENGL 6674. Applied Research Methods in the Teaching of English. (4) Prerequisites: Completion of ENGL/EDUC 6274 and 12 hours of graduate credit toward this degree. Building on the research basis established in ENGL/EDUC 6274, this course provides the opportunity to apply research methods in classrooms. Examine identities as readers, writers, teachers, and especially as classroom researchers. (*Spring*) (*Evenings*)

ENGL 6680. Seminar in British Literature. (3) May be repeated for credit as topics vary. (*Yearly*)

ENGL 6685. Seminar in American Literature. (3) May be repeated for credit as topics vary. (*Yearly*)

ENGL 6890. Directed Reading. (1-3) (*Fall, Spring, Summer*)

ENGL 6974. Thesis/Project in the Teaching of English. (6) Prerequisite: permission of the Department. Research integrating the fields of English and Education in a theoretical or application-oriented study. If the thesis/project is the outgrowth of previous coursework, considerable additional research and exposition must be done.

ENGL 6996. Thesis. (6) Appropriate research and written exposition of that research, which may or may not be an outgrowth of work done in previous courses. If the thesis is the outgrowth of previous coursework, considerable additional research and exposition must be done beyond that previously undertaken. The proposed thesis work, as well as the final product, will be approved by a committee of three graduate faculty appropriate to the topic, appointed by the graduate coordinator after consultation with the student, on the basis of a written proposal from the student. It is recommended that thesis work not be undertaken until near the end of the student's program. The thesis title is to be shown on the student's final transcript. A Creative thesis option is available for students who have completed appropriate coursework in Creative Writing. (A statement of recommendations and requirements for form and procedures is available in the English Department office.) (*Fall, Spring, Summer*)

ENGL 7999. Master's Degree Graduate Residency Credit. (1) (*Fall, Spring, Summer*)

Ethics and Applied Philosophy

- M.A. in Ethics and Applied Philosophy
- Graduate Certificate in Applied Ethics

Department of Philosophy

103 Winningham
704-687-2161
<http://philosophy.uncc.edu>

Coordinator

Dr. Marvin Croy

Graduate Faculty

Dan Boisvert, Lecturer
Marvin Croy, Associate Professor

Michael Eldridge, Lecturer
William Gay, Professor
Gordon Hull, Assistant Professor
Robin James, Assistant Professor
Michael Kelly, Professor and Chair
Lisa Rasmussen, Assistant Professor
Eddy Souffrant, Associate Professor
Rosemarie Tong, Mecklenburg County Medical Society
Distinguished Professor in Health Care Ethics

MASTER OF ARTS IN ETHICS AND APPLIED PHILOSOPHY

The program is designed to foster the application of ethical and philosophical knowledge to currently pressing concerns in social, economic, medical, legal, commercial, cultural, and political contexts and associations. The department offers both theoretical and applied courses. These courses provide students with a comprehensive, normative, politically-informed and logically consistent training relevant to current challenges encountered in business, medical associations, national and international political contexts, as well as public education.

Admission Requirements

In addition to meeting the university's graduate admission requirements, all prospective students must:

- Submit a personal statement outlining why the applicant seeks admission to the program.
- Submit three academic letters of recommendation, attached to the recommendation forms required by the Graduate School, which address the student's philosophical skills and/or ethical reasoning.

Degree Requirements

The Master of Arts in Ethics and Applied Philosophy requires the completion, with a GPA of 3.0 or better, of a minimum of 30 semester hours of approved graduate course work. The successful completion of a Thesis or Practicum is also required for the Master of Arts. Prior to starting a thesis or practicum, a student in the M.A. program will have to apply for readmission if the student has not taken any class for 12 months. All degree requirements must be completed within six calendar years of first enrollment in the program.

Course Distribution

Theoretical Courses (6 credits), drawn from the following:

PHIL 6050 Topics in Philosophy
PHIL 6219 History of Ethical Theory
PHIL 6272 Idea of Human Nature
PHIL 6050 Contemporary Ethical Theory

Traditional and Applied Courses (18 credits), drawn from the following (with at least two courses in each category):

Traditional

PHIL 6227 Feminist Theory and Its Applications
 PHIL 6241 Philosophy of Education
 PHIL 6249 Philosophy of Technology
 PHIL 6050 Ethics and International Relations
 PHIL 6050 Business Ethics
 PHIL 6050 Philosophy of Mind

Applied

PHIL 6229 Health Law and Ethics
 PHIL 6233 Bioethical Issues and the New Genomics
 PHIL 6246 Language and Violence
 PHIL 6050 Ethics of Public Policy
 PHIL 6050 Ethics and Aesthetics
 PHIL 6050 Race and Philosophy
 PHIL 6050 Environmental Philosophy

Capstone Course & Concluding Project (6 credits), drawn from the following:

PHIL 6851 Practicum in Philosophy*
 PHIL 6853 Internship
 PHIL 6855 Directed Readings/Research*
 PHIL 6857 Thesis

**PHIL 6851 (Practicum in Philosophy) and PHIL 6855 (Directed Readings/Research) may count only once each toward the M.A.*

Admission to Candidacy Requirements

An Admission to Candidacy form is to be filed upon the completion of 24 hours of course work.

Advising

The coordinator of graduate studies serves as formal advisor to the graduate students.

Transfer Credit

Up to 6 hours earned from other accredited institutions may be eligible for transfer credit. Formal approval must be obtained from the coordinator of graduate studies and the Dean of the Graduate School.

Language Requirement

Although students are not required to demonstrate proficiency in a foreign language as a formal requirement of the program, they are expected to acquire competency in and use whatever languages they need to pursue their research interests.

Thesis

Students have the option of writing a thesis (3 semester hours credit) in fulfilling the capstone/concluding project requirements. Other courses in this category include Practicum in Philosophy, Internship, and Directed Readings/Research.

Application for Degree

Graduation information, including deadlines for candidacy and degree application, are available online from the Graduate School at www.uncc.edu/gradmiss/c_graduation.html.

GRADUATE CERTIFICATE IN APPLIED ETHICS

The Graduate Certificate in Applied Ethics is of interest to three groups of students: (1) professionals working in areas of applied ethics; (2) students just beginning to explore graduate work in philosophy; (3) students in other master's and doctoral programs, such as biology, health administration, and public policy, who expect their careers to include work in applied ethics.

Admission Requirements

In addition to meeting the university's graduate admission requirements, all prospective students must:

- Submit a personal statement outlining why the applicant seeks admission to the program
- Submit two academic letters of recommendation, in addition to the recommendation forms required by the graduate school, which address the student's philosophical skills and/or ethical reasoning

Prerequisite Requirements

A bachelor's degree from an accredited institution and a minimum undergraduate GPA of 2.75 is required for admission to the Graduate Certificate program.

Certificate Requirements

The Graduate Certificate in Applied Ethics requires the completion of 15 credits of graduate course work in philosophy. The coursework should be distributed as follows:

Theoretical courses (3 credits), drawn from the following:

PHIL 6050 Contemporary Ethical Theory
 PHIL 6219 History of Ethical Theory
 PHIL 6272 Idea of Human Nature

Elective courses (9 credits), drawn from the following:

PHIL 6050 Business Ethics
 PHIL 6050 Ethics and Aesthetics
 PHIL 6050 Ethics and International Relations
 PHIL 6050 Ethics of Public Policy
 PHIL 6050 Philosophical Methods and Analysis
 PHIL 6050 Philosophy of Mind
 PHIL 6050 Race and Philosophy
 PHIL 6227 Feminist Theory and Its Applications
 PHIL 6229 Health Care Ethics and Law
 PHIL 6233 Bioethical Issues and the New Genomics
 PHIL 6241 Philosophy of Education

PHIL 6246 Language and Violence
PHIL 6249 Philosophy of Technology

Concluding Project (3 credits), one of the following:

PHIL 6851 Practicum in Philosophy
PHIL 6853 Internship
PHIL 6855 Directed Readings/Research

Approval of the Philosophy Department Graduate Coordinator is required in order to substitute related courses offered by other departments and programs.

Advising

Dr. Marvin Croy

Transfer Credit

Transfer credit is not accepted in the certificate program.

COURSES IN PHILOSOPHY

PHIL 5050. Topics in Philosophy. (1-3) Prerequisite: Permission of the department. In-depth treatment of selected problems and issues in philosophy. May be repeated for additional credit as topics vary. (*On demand*)

PHIL 6050. Topics in Philosophy. (1-3) Prerequisite: Permission of the department. In-depth treatment of selected problems and issues in philosophy. May be repeated for additional credit as topics vary. (*On demand*)

PHIL 6219. History of Ethical Theory. (3) Discussion of the traditional ethical theories articulated in philosophy, and their relationship to contemporary personal and professional ethics. (*Yearly*)

PHIL 6227. Feminist Theory and Its Applications. (3) Discussion of selected works in feminist thought across the disciplines, with the opportunity for students to develop original research in an area of interest. (*Alternate years*)

PHIL 6229. Health Law and Ethics. (3) Explores the relationship between ethical and legal aspects of controversial issues in health care. (*Alternate years*)

PHIL 6233. Bioethical Issues and the New Genomics. (3) Discussion of new genetic technologies and their ethical implications. (*Alternate years*)

PHIL 6241. Philosophy of Education. (3) Exploration of modern philosophies of education, with a focus on the relationships between pedagogy and society. (*Alternate years*)

PHIL 6246. Language and Violence. (3) Explores philosophical theories on the relationship between language and violence, on a continuum from subtle forms of covert personal violence to grievous forms of covert institutional violence. (*Alternate years*)

PHIL 6249. Philosophy of Technology. (3) Examines philosophical views on the nature of technology, focusing on its effects on society and nature. Computer technologies and other cases will be considered. (*Alternate years*)

PHIL 6272. Idea of Human Nature. (3) Explores whether there is such a thing as human nature, and creates a dialogue among different conceptions of human nature. Philosophical theorizing will be informed by readings from philosophy, religion, psychology, biology, multicultural studies and gender studies. (*Yearly*)

PHIL 6851. Practicum in Philosophy. (3) Offers advanced graduate students an opportunity to explore in practice ideas they have studied in the classroom through internships and applied research projects. (*Alternate years*)

PHIL 6855. Directed Readings/Research. (3) Offers advanced graduate students an opportunity to conduct independent readings and research. (*Alternate years*)

PHIL 7999. Master's Degree Graduate Residency Credit. (1) (*Each Semester*)

PHIL 8050. Topics in Philosophy. (1-3) Prerequisite: Permission of the department. In-depth treatment of selected problems and issues in philosophy. May be repeated for additional credit as topics vary. (*On demand*)

Geography

- **Ph.D. in Geography and Urban Regional Analysis**
- **Ph.D. in Infrastructure and Environmental Systems** (*see section on Inter-College Graduate Programs*)
- **M.A. in Geography**

Department of Geography and Earth Sciences

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Ph.D. Program Coordinator

Dr. Owen Furueth

M.A. Program Coordinator

Dr. Harrison Campbell

Graduate Faculty

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John Bender, Professor

Andy Bobyarchick, Associate Professor
 Harrison Campbell, Associate Professor
 John Chadwick, Assistant Professor
 Eric Delmelle, Assistant Professor
 John Diemer, Professor
 Matt Eastin, Assistant Professor
 Martha C. Eppes, Assistant Professor
 Owen Furuseth, Professor
 Bill Graves, Associate Professor
 Edd Hauser, Professor
 Scott Hippensteel, Associate Professor
 Gerald Ingalls, Professor
 Sallie Ives, Associate Professor
 Anne Jefferson, Assistant Professor
 Walter Martin, Associate Professor
 Ross Meentemeyer, Associate Professor
 Tyrel Moore, Professor
 Heather Smith, Associate Professor
 Janni Sorensen, Assistant Professor
 Deborah Strumsky, Assistant Professor
 Jean-Claude Thill, Knight Distinguished Professor
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PH.D. IN GEOGRAPHY AND URBAN REGIONAL ANALYSIS

The Ph.D. in Geography and Urban Regional Analysis focuses on the theoretical and empirical analysis of metropolitan areas and their broader regional, national and global contexts. At the core of this program is the recognition that cities are complex systems made up of environmental and human elements, with critical multiscalar interactions and outcomes. Although the processes and issues that frame urban-regional analysis are global in scope, the research lens of the Ph.D. program is focused on the United States, and, especially regional topics and research questions. Indeed, the Charlotte area and other urban and metropolitan regions in the southeastern United States offer laboratories for examining economic, social, and environmental change processes that are at work across the world.

Building on the strengths and research interests of the graduate geography faculty and colleagues across campus, there are currently three broad research clusters within the doctoral program. These include:

- urban/regional systems
- human-environmental interactions
- GIScience

The theoretic and empirical understanding of these research areas is guided by multiscalar analytical techniques, both quantitative and qualitative. Geographic information science (GIScience) is both a research focus and fundamental research tool.

The research clusters provide opportunities for integration and complementarity, with shared methods and theoretic structures; as well as, the focus on the urban-regional scale. In line with current research trends, scholarship that bridges human geography and environmental systems is an area of significant interest. In this context, GIScience is a fundamental tool in all aspects of the doctoral program.

A cornerstone of the program is the student's research dissertation. Each dissertation is expected to be based on independent and original research which contributes to the body of knowledge in the field, leading to publication in peer-reviewed journals.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for study to the Ph.D. in Geography and Urban Regional Analysis:

Under most circumstances, students admitted to the program will have:

- 1) A M.A or M.S. degree in geography or field related to the primary emphases of the Program.
- 2) A master's level GPA of 3.5 out of 4.0. In exceptional cases students with baccalaureate degrees may be admitted if they have an overall undergraduate GPA of at least 3.6 and meet other admission requirements. Students without master's degrees will be required to complete substantial prerequisites necessary to work at a Ph.D. level.
- 3) Graduate Record Examination (GRE) with an average score of 600 on the verbal and quantitative and a 5.0 on the analytical portions. Applicants must have taken the GRE; no other test will be accepted in its place.
- 4) TOEFL exam scores of at least 557 for applicants whose native language is not English. The program expects a minimum score of 55 on each of the components of the TOEFL, or a 220 on the computer-based TOEFL, or an 83 on the internet TOEFL, or an 85 percent on the MELAB. In addition, international students who will be teaching assistants will be required to undergo evaluation by the English Language Training Institute at UNC Charlotte prior to beginning their first semester of study.
- 5) GIS proficiency at a minimum of the applications level is required. Other remedial course work, as determined by the program Admissions Committee, may also be required depending on the background of the student.
- 6) Three letters of recommendation, at least two of which must come from faculty in the student's previous academic programs.

Degree Requirements

The Ph.D. acknowledges the value of course work as background and preparation for research, but the primary emphasis is on the development of research skills and the completion of a research project on a problem significant to urban regions.

- 1) **Total Hours required.** 33 hours of coursework; 18 hours of dissertation units; 51 hours total beyond the master's degree; students entering the Program without a master's will be required to complete additional coursework to prepare for work at the Ph.D. level.
- 2) **Course Work.** While the curriculum and experiential background of all students accepted into the program will be evaluated upon entry, students entering the program would, at a minimum, be required to demonstrate proficiencies at the level of Intermediate GIS (UNC Charlotte equivalent GEOG 4120 or a minimum of two courses such as basic and intermediate GIS); a Master's level research design class (UNC Charlotte equivalent GEOG 6131 or a Master's level research thesis); and a Master's level quantitative methods class (UNC Charlotte equivalent of GEOG 6100). Students who fail to meet these minimum requirements would not be permitted to enroll in classes for which they do not have the prerequisites

Core Courses (required of all students)

GEOG 8100 Quantitative Methods in Geography
 GEOG 8123 Urban Regional Environment
 GEOG 8124 Seminar in Geographic Theory and Research Design

All students are required to complete a minimum of 24 credit hours. Students can take related courses outside the program with prior approval.

- 3) **Proportion of courses open only to graduate students.** All program approved courses are open to graduate students only.
- 4) **Grades Required.** A student must maintain a cumulative average of 3.0 in all course work taken for graduate credit. A grade of *C* will result in the student being required to *re-take the course*, and being placed on probationary status within the Program, and could potentially mean the loss of funding if the student is receiving departmental funding. Two *C* grades or one *U* will result in termination from the program even if the second *C* is the result of retaking a course.
- 5) **Amount of transfer credit accepted.** Six credit hours or two courses of Ph.D.-level coursework can be transferred from another accredited Ph.D. program. However, in special circumstances and with the approval of the Graduate School, additional transfer credit may be possible. These exceptions will involve only students requesting transfers from other accredited universities and only for courses completed within the previous four years and for work beyond the master's.
- 6) **Comprehensive Exams.** After completing required course work, students will first take a written and oral Comprehensive Exam. Passing the Comprehensive Exam allows the student to proceed toward the proposal of their dissertation. Students failing the Comprehensive Exam will be permitted to retake the exam once. Failure on the second try will result in termination from the Program. All students must pass the comprehensive exam before writing a dissertation proposal.
- 7) **Advisor / Advisory Committee.** All students in the program will have both a graduate advisor approved by the program Director and an Advisory Committee. The advisor will help a student formulate a *Program of Study* including a potential dissertation topic by no later than the end of the second semester of study (or 12 hours of coursework in the case of part-time students). The *Advisory Committee* will consist of the student's advisor, a second faculty member selected by the student and the advisor and a third faculty member appointed by the program Director. The *Program of Study* will be reviewed by the student's Advisory Committee and must be approved by the program Director.
- 8) **Dissertation Proposal and Advancement to Candidacy.** Advancing to candidacy requires that the student pass the comprehensive exam and write and successfully defend a dissertation proposal. The proposal must be submitted to the student's Advisory Committee for preliminary approval and then to the Director and the Dean of the Graduate School. Successful defense of the dissertation proposal is followed by advancement to candidacy.
- 9) **Dissertation.** A dissertation is required of all Ph.D. students that constitutes a significant contribution to the body of geographic and scientific knowledge and/or thought. Ph.D. students are required to enroll for a minimum of 18 hours or a maximum of 24 hours of dissertation credits. The dissertation consists of a written document of original research. Though there are options concerning the dissertation format, each dissertation will be subject to an oral defense of the dissertation document.
- 10) **Time Limits for Completion of the Degree.** It is generally expected that full-time students will complete course work within a three-year time frame and the dissertation will be completed one to two years later. Students must achieve admission to candidacy within six years after admission to the program. All requirements for the degree must be completed within eight years after first registration as a doctoral student. Further, the oral examination in defense of the dissertation must be passed within five years after being advanced to candidacy.
- 11) **Residency.** Residency requirements for the program include completing 21 hours of continuous enrollment, either as course work or dissertation credits. Residence is considered to be continuous if the student is enrolled in one or more courses in successive semesters until 21 hours are earned.

MASTER OF ARTS IN GEOGRAPHY

The M.A. in Geography at UNC Charlotte emphasizes the application of geographic skills, methods, and theories to problem solving in contemporary society. To this end, students are offered a solid foundation in research methods, problem formulation and solution, quantitative methods, computer applications and Geographic Information Systems (GIS). Faculty and students are active in the community and, when possible, students are encouraged to complete their programs with either funded or unfunded private or public sector internships.

One of the program's greatest strengths is the close relationship between its students and faculty and among the students themselves. Small class sizes, close student and faculty contact and a strong sense of community are considered essential components of the learning and teaching environment at UNC Charlotte.

The applied geography program at UNC Charlotte is recognized as one of the best of its kind in the country. Its graduates go directly into jobs as professional geographers, research and/or marketing specialists, location analysts, planners, transportation specialists, and consulting. About 10 percent of the more than 250 graduates of the program have gone on to study in Ph.D. programs.

Additional Admission Requirements

It is the policy of the Department to provide equal opportunities to all students regardless of race, creed, color, gender, or national origin. The Department maintains slightly different requirements than the general requirements for admission to graduate study at UNC Charlotte. The Department requires that applicants demonstrate evidence of suitability for the programs via evaluation in the five major areas listed below. These are weighted equally.

All applications for admission to the Geography M.A. Community Planning track will be reviewed by the Community Planning Track Interdisciplinary Entrance Committee. All other applications for admission will be reviewed by the Geography Graduate Advisory Committee. The Department will admit applicants on a competitive basis as space in the program allows and grant exceptions to the minimum standards if deemed in the best interests of the program.

- 3) **Grade Point Average (GPA):** In general, the Department would prefer an overall GPA above 3.1 (or a 3.1 for the last 2 years) and a GPA of 3.2 in the major. However, averages less than these will not exclude applicants if the other elements of the application are strong.
- 6) **Letters of Recommendation:** Three letters of reference are required. Letters from college or university teachers who have worked with and/or taught applicants are preferred. These letters will be evaluated on the basis of how well the applicant is suited in terms of intellect,

motivation and temperament to do graduate course work.

- 7) **Personal Essays:** Applicants must write a personal essay which directly addresses why they wish to do graduate work in geography and why they wish to participate in the M.A. program at UNC Charlotte. They should address directly how the program at UNC Charlotte fits their career and/or professional goals and how they would benefit from and contribute to the M.A. in Geography at UNC Charlotte. This essay is very important in determining the applicant's commitment to graduate education and to a professional career in geography or a related field. Careful consideration of what goes into this essay is time well spent.
- 8) **Scores on the Graduate Record Exam:** In general, the Department would prefer scores in the range of 1000 or more on the combined Verbal and Quantitative portions of the GRE. Again, scores less than these suggested minimums will not automatically exclude applicants if the remainder of the applicant's file is strong.
- 9) **Transcripts of College Course Work:** The transcripts will be evaluated on the basis of types of courses attempted, range of geography, statistical and computer course work attempted. Not only will the applicant be evaluated on the strength of the performance in these areas, but also on the range, depth and suitability of the applicant's preparation for graduate level course work.

Additional Requirements for International Applicants:

Applicants whose native language is not English must demonstrate their proficiency in English by taking the Test of English as a Foreign Language (TOEFL) examination. Overall scores of 575 with scores of 55 on individual sections (listening comprehension; structure and written expression; vocabulary and reading comprehension) are preferred.

Prerequisite Requirements (*Minimum Preparation Suggested for Students Entering the Program*):

All prospective graduate students must demonstrate competence in the undergraduate subject matter in their area of study. While the Department does not require that applicants have a degree in Geography, prospective graduate students should provide evidence that they are prepared to immediately take full advantage of graduate level course work in Geography.

Students applying to the program should, at a minimum, be familiar with the concepts and materials offered in courses such as basic Economic Geography, Introduction to Spatial Analysis, Location Theory, and Introduction to Research Methods or Statistics. Any student wishing to pursue additional training in Geographic Information Systems (GIS) should have basic cartography preparation and computer file management and data base skills. The relevant courses at UNC Charlotte are Maps and Graphs and Cartographic Lab.

The courses noted above are considered basic for admission to the UNC Charlotte Master of Arts in Geography Program. Consequently, a student will normally not be considered prepared for graduate study without equivalent course work. Any student passing the above courses with a grade of B or better at UNC Charlotte or the equivalent courses from another university with a grade of at least B will not be judged deficient in these courses and will not be denied entry based solely on a lack of preparation. All judgments in this area are the responsibility of the Graduate Advisory Committee, the Community Planning Interdisciplinary Committee, and the Department Chair.

Assistantships

Graduate assistantships are arranged for either one entire semester or for an entire academic year (2 semesters or 9 months). They are normally scheduled for 16 weeks per semester and the student works 20 hours per week. Assistantships are funded at the rate of \$4,500-\$5,000 per semester. The Department makes every effort to provide funding to every full-time student in the program.

Degree Requirements

The M.A. in Geography requires a minimum of 36 semester hours of graduate work. Three specific courses (12 semester hours) are required of all students except those pursuing the Community Planning Track. Of the remaining 24 hours, a minimum of 12 hours must be completed through 5000-6000 level geography course work. Up to 12 hours may be taken in related work which includes all transfer credit, credit by exam, and course work in other departments at or above the 5000 level. At the discretion of the department, transfer credit totaling up to 6 hours may be accepted from accredited universities. No student may take more than 6 hours in graduate level independent study (GEOG 6800).

Required Courses *(for all except the Community Planning Track)*

- GEOG 6100 Quantitative Methods in Geography (3)
- GEOG 6131 Research Design Fundamentals (3)
- GEOG 7900 Individual Research Project (6)

Elective Courses

- 4) Other 5000 or 6000-level courses in Geography -- a minimum of 12 hours
- 10) Related work (outside the Department) or transfer credits in courses numbered 5000 and above-- maximum of 12 semester hours.

Advising

Upon admission to the program each student will be assigned a faculty advisor from the student's declared area of interest. This advisor will help guide the student through the design and implementation of a program of study tailored to the student's specific needs and career goals. The advisor will be available to the student for advice on academic and other matters. Students must confer with their advisors regularly concerning academic matters.

More often than not, students will not work with the same advisor throughout the entire program. Once the student has become familiar with the program and the faculty, it is possible to change advisors by obtaining prior approval from the faculty member with whom the student wishes to work. Advisors should be chosen to match, as nearly as possible, the student's academic and career interests. No student will be allowed to register for a class without an advising session with their advisor. The advisor will remove the advising hold at this session.

All students are required to formulate a complete plan for their M.A. during pre-registration for second semester. This plan must be approved by their advisor and will serve as a guide to their course of study while at UNC Charlotte.

Academic Standards

From the date of admission to graduation, the Department conducts a continuous review of student academic and professional performance. In addition to evaluations conducted within the courses taken by students, the faculty conduct a thorough review of student performance on a regular basis. Continuation in the program is contingent upon a favorable review during these evaluations. Students who consistently show borderline course performance, who are not developing good applied skills in the practice of their chosen area of study, who fail to complete coursework on a timely basis, or who otherwise perform unprofessionally or unsatisfactorily, may be required to complete additional courses or may be terminated from the program.

Department academic standards deviate slightly from university policies stated in appropriate catalogs. An accumulation of two (2) marginal (C) grades, or one (1) unsatisfactory (U) grade will result in termination of student's enrollment in the graduate program. In order to continue a program of study, the student must reapply for admission to the program.

Special care should be exercised in completing the requirements of a course in which a grade of Incomplete (I) is received. With the exception of GEOG 6131, where incomplete grades are not normally given, incomplete work must be finished during the next semester in residence, but not later than 12 months after the end of the term in which the "I" was assigned, whichever comes first. However, the course instructor has the option of specifying a completion deadline anytime within the 12-month period. If the "I" is not removed during the specified time, a grade of "U" is automatically assigned. In any case, a student will not be allowed to schedule the final comprehensive examination until all incomplete grades are removed. Also, with the exception of GEOG 7900, no student may have more than two incomplete grades at any time. Students with two or more incompletes may not register for another term.

Concentrations

Students may elect to study in one or a combination of three concentrations and one track. The concentrations are location analysis, urban-regional analysis, and transportation

studies. The University's interdisciplinary Community Planning Track also is housed within the M.A. in Geography.

1. Location Analysis

Overview

The location analysis concentration offers course work in retail location, applied population analysis, facility siting, office and industrial location, trade area analysis, real estate development, location research, and regional economic development.

This concentration prepares students for jobs in location research with retail companies, real estate developers, consulting firms, commercial banks, and economic development agencies or for continued academic training in economic geography and location analysis. Courses are taught by practitioners in the career fields listed above.

Course Work

The following courses are suggested for a concentration in location analysis:

- GEOG 5108 Sport, Place and Development (3)
- GEOG 5155 Retail Location (3)
- GEOG 5255 Applied Population Analysis (3)
- GEOG 6000 Selected Topics in Economic Geography (3)
- GEOG 6030 Topics in Geographic Techniques (3)
- GEOG 6103 Real Estate Development (3)
- GEOG 6301 Industrial Location (3)
- GEOG 6305 Site Feasibility Analysis (3)
- GEOG 6306 Store Location Research (3)

2. Urban-Regional Analysis

Overview

The urban-regional analysis concentration offers course work in community development, regional development, GIS based analysis, site feasibility analysis, public facility siting, urban economics and social geography.

Students normally gain employment in public sector community development and economic development as well as the private sector.

Graduates of the M.A. in Geography program hold positions in a number of local and regional agencies in North Carolina and South Carolina as well as in other states such as California, Colorado, Connecticut, Florida, Georgia, Kentucky, New York, and Washington. They have responsibility for a broad range of development issues and tasks including economic development, geographic information systems, housing, land use, community and neighborhood analysis. Job placement for graduates has been very successful.

Course Work

Students normally choose courses from the following for a concentration in urban-regional analysis:

- GEOG 5101 Cartographic Techniques (3)
- GEOG 5103 Computer Mapping (3)
- GEOG 5108 Sport, Place and Development (3)
- GEOG 5120 Introduction to Geographic Information Systems (4)
- GEOG 5130 Advanced Geographic Information Systems (4)
- GEOG 5210 Urban Planning Methods (3)
- GEOG 5255 Applied Population Analysis (3)
- GEOG 5260 Transportation Policy Formulation (3)
- GEOG 5265 Transportation Analysis Methods (3)
- GEOG 6015 Topics in Regional Geography (3)
- GEOG 6103 Real Estate Development (3)
- GEOG 6210 The Restructuring City (3)
- GEOG 6300 Applied Regional Analysis
- GEOG 6301 Industrial Location (3)
- GEOG 6305 Site Feasibility Analysis (3)
- GEOG 6400 Spatial Decision Support Systems (4)
- GEOG 6500 Urban Planning: Theory & Practice (3)

3. Transportation Studies

Overview

Students in the transportation studies concentration can pursue course work in transportation systems analysis, policy formulation, impact analysis, and planning. This concentration prepares students for jobs in the public and private sector, usually as planners in the public sector and as analysts for transportation providers and for consulting companies in the private sector.

Job Prospects

Graduates with this concentration in transportation studies have taken positions with local and regional planning agencies, consulting firms, and transit management companies across North Carolina and the U.S.

Course Work

The following courses comprise the transportation studies concentration:

- GEOG 5040 Transportation Topics (3)
- GEOG 5160 Geography of Transportation Systems (3)
- GEOG 5260 Transportation Policy Formulation (3)
- GEOG 5265 Transportation Analysis Methods (3)
- GEOG 5270 Evaluation of Transportation Impacts (3)

Selected courses offered by the Civil & Environmental Engineering and Marketing Departments also are available for students in this program.

4. Community Planning

Overview

The Community Planning Track is structured to provide students with grounding in planning skills, methods and theory, and practical experience for careers in community planning. That structure is supported by interdisciplinary perspectives from core coursework in Architecture, Economics, Geography, and Public Administration.

Job Prospects

Graduates have been hired by local and regional planning agencies to give the track an excellent placement success rate. Perhaps a third of the students who pursue the program are practicing planners who wish to build and improve their professional skills.

Curriculum - Required hours 36 semester hours

The track comprises an interdisciplinary curriculum. Core requirements and approved electives are listed below:

Core coursework (21 hours, required of all students)

- GEOG 5210 Urban Planning Methods (3)
- GEOG 6100 Quantitative Methods in Geography (3)
- GEOG 6500 Urban Planning: Theory & Practice (3)
- GEOG 6501/ARCH6050 Community Planning Workshop (3)
- ARCH 5214 Dilemmas of Modern City Planning (3)
- ECON 6250 Advanced Urban and Regional Economics (3)
- MPAD 6128 Foundations of Public Policy (3)

Elective Coursework (minimum 9 hours) from the following:

- GEOG 5120 Introduction to Geographic Information Systems (4)
- GEOG 5130 Advanced Geographic Information Systems (4)
- GEOG 5209 Small Town Planning (3)
- GEOG 5255 Applied Population Analysis(3)
- GEOG 5260 Transportation Policy Formulation (3)
- GEOG 5265 Transportation Analysis Methods (3)
- GEOG 5270 Evaluation of Transportation Impacts (3)
- ARCH 6050 The Architecture of Settlements (3)
- ARCH 6050 Public Spaces in Cities (3)
- ARCH 6050 Urban Transit and City Form (3)
- ARCH 7103/ARCH 7104 Urban Design Problems (Topical Studio) (5)
- MPAD 6102 Legal and Institutional Foundations of Public Administration (3)
- MPAD 6131 Public Budgeting and Finance (3)

Capstone Research Project (6 hours, required of all students)

- GEOG 7900 Individual Research Project (6) (taken in final semester)

Research Options

The program requires all students to complete a thesis-quality, individual capstone research project. Although individual research experiences may differ, students should pursue research experiences that are appropriate to departmental faculty resources, individual student's programs and career goals, and the availability of opportunities that exist to work with allied agencies or clients on or off campus. One of three options, depending on the previously stated stipulations, will be available: 1) a research experience similar to that of a traditional academic thesis; 2) a research experience which involves a paid internship funded by and arranged with a public or private

agency or client; and 3) a research experience involving an internship that is not funded, but arranged with a public or private agency or client. Each of these options fulfills program requirements equally. Each will produce a finished research effort of thesis quality.

Not every student can expect to develop a capstone research project that is similar to a traditional academic thesis. It does, however, provide a choice for students to pursue a research problem in a direction of his/her individual interest. Students who ultimately plan to pursue a Ph.D. degree might be more inclined and encouraged toward that option. The same is true of students who wish to complete their master's program with that kind of individual research activity. In all cases, students must work closely with their advisor and program committee to choose the option which best fits both their particular program and prevailing circumstances.

Not every student can expect to engage in a capstone research project that is a paid internship because the number of students frequently exceeds a matching number of opportunities funded in that manner. Unpaid internships provide the same caliber of experience and training in an applied environment. In some cases, that experience may relate student with non-profit agencies or social services that simply do not have the resources to fund an internship. In either case, the topic of the internship is defined by the client's problem or needs.

Committees

All GEOG 7900 Research Projects are evaluated by a committee of faculty. Committees must have a minimum of three members composed of the graduate faculty of the department--or related departments. Committee members may include outside members from other departments or internship coordinators from off-campus agencies when appropriate.

Admission to Candidacy Requirements

The Admission to Candidacy form should be filed upon successful completion of a minimum of 18 semester hours of graduate work. Deadlines are posted on the Graduate School's website. Completed forms forwarded to Graduate School must include a capstone research project title and the names of faculty who comprise the student's committee.

Comprehensive Examination

To complete the program, each student must pass a two part comprehensive examination covering both general aspects of the discipline and defense of the individual capstone research project. It is the responsibility of the advisor or committee chair, in consultation with the student, to arrange each of the exams.

The Written Exam - Part 1 of the comprehensive is a written exam in which the student must respond to three questions submitted by the faculty. These questions are solicited from the entire graduate faculty of the Department by a memo sent by student's advisor who then administers the

examination. The written comprehensive exam is normally taken during the third semester (for full-time students) and in no case should the student take this exam before accumulating 27 hours of completed course work including courses in progress. This exam may not be administered if the student has outstanding incomplete grades in any course work.

The Defense of the (GEOG 7900) Individual Research Project - Part 2 of the comprehensive exam is the defense of the individual research project (GEOG 7900)—the capstone research project. This exam is generally administered at the discretion of the committee chair and the student. When the advisor is satisfied that the student's research and writing has progressed sufficiently the research document is provided to the other members of the independent research committee; if they agree that the document is ready for a defense, an exam is scheduled.

COURSES IN GEOGRAPHY

GEOG 5000. Topics in Geography. (3) Major topics in Geography. May be repeated for credit as topics vary. (Yearly) (Evening)

GEOG 5040. Transportation Topics. (3) Prerequisite: permission of department. Investigation of special topics in transportation including: transit systems, mobility and travel patterns, land use/transportation interface, air pollution, and information systems. (Spring) (Alternate years)

GEOG 5101. Cartographic Techniques. (3) Prerequisite: GEOG 2100. Preparation of maps, figures and charts at a professional level of competence. Techniques to be emphasized include desktop mapping with computers, high resolution imagesetting output, color separation techniques which include computer separations as well as scribing and various related photographic processes. Two laboratories of three hours each per week. (Spring)

GEOG 5102. Cartographic Design and Map Construction. (3) Design process and basic map construction techniques with particular emphasis on the graphic elements of map design, planning map design, creating visual hierarchies, the uses of color, and basic mechanical color separation. (Fall)

GEOG 5103. Computer Mapping. (3) Prerequisites: GEOG 2100 and CSCI 1100 or 1201 and its lab, or permission of instructor. Automated methods of gathering, storing, manipulating and displaying spatial data. Emphasis on the use of existing software and the design and implementation of geographic data structures and algorithms. (Spring)

GEOG 5108. Sport, Place and Development. (3) Prerequisites: GEOG 1105. Examines sport and its impact on the landscape of cities and communities. Implications of sport are examined in terms of urban use, urban social

structure, markets, franchise movement and expansion, urban politics, its role in defining sense of place, and its impact on the development of communities and regions. (Spring)

GEOG 5120. Introduction to Geographic Information Systems. (4) Prerequisite: permission of instructor. Development, current state-of-the-art and future trends in geographic information processing with emphasis on data gathering, storage, and retrieval, analytical capabilities and display technologies. A laboratory component will include development and completion of an applied GIS research project. Additional requirements for graduate credit. Three lecture hours, one two-hour lab per week. (Fall)

GEOG 5130. Advanced Geographic Information Systems. (4) Prerequisite: GEOG 5120 or permission of instructor. Advanced GIS study with emphasis on (1) advanced skills for database development and management; (2) spatial analysis and modeling; and (3) Macro language programming and user interface design. Three lecture hours and a two-hour lab session each week. (Spring)

GEOG 5155. Retail Location. (3) Spatial attributes of retailing and related activities. Location patterns, store location research, trade area delineation and consumer spatial behavior. (Spring)

GEOG 5160. The Geography of Transportation Systems. (3) Geographical and human factors that affect the movement of goods and people from place to place. Emphasis on transportation routes and networks, commodity flow patterns and the locational implications of freight rates. (Spring)

GEOG 5209. Small Town Planning. (3) This course will explore small town population dynamics, rural-urban fringe land use dynamics, and changes in small towns' community identity and sense of place. Emphasis will be placed on the issues and techniques that typify small town planning environments. Students will investigate these issues via field work and data collection at municipal scales within the Charlotte region.

GEOG 5210. Urban Planning Methods. (3) Prerequisite: GEOG 5205 or permission of the instructor. Scope and methods of urban planning. Emphasis on analytical techniques, projections, and data sources used in developing comprehensive planning tasks and strategies. (Fall)

GEOG 5255. Applied Population Analysis. (3) Population data sources; measuring population change; elementary projection and estimation techniques; spatial sampling; migration; survey design; applications in the public and private sectors. (Fall)

GEOG 5260. Transportation Policy Formulation. (3) Prerequisite: permission of department. Structure of transportation policy at federal, state, and local levels including policies concerning highway financing and

investments, congestion, safety, and use and development, energy, transit, and the provision of intercity services. *(Fall)*
(Alternate years)

GEOG 5265. Transportation Analysis Methods. (3)
Prerequisite: permission of department; statistics recommended. Procedures for analyzing the operation and performance of transportation systems; includes network planning models, minimum path algorithms and assignments; energy, air pollution, and activity analysis models; and research approaches, data sources, time and activity budgets, infrastructure condition and needs assessment. *(Spring)* *(Alternate years)*

GEOG 5270. Evaluation of Transportation Impacts. (3)
Prerequisite: permission of department. Methods and case studies for evaluating impacts and benefits of transportation investments including site-level impact analysis; project, corridor, and area scales; multi-modal evaluation and examination of mutually exclusive alternatives. *(Fall)*
(Alternate years)

GEOG 5310. Urban Social Geography. (3) Prerequisites: GEOG 1105 and at least one of GEOG 2200, GEOG 2165, GEOG 3100, or GEOG 3205, or permission of the instructor. Examines the reflexive relationship between society and urban space. Explores the intersection between urban geography and social theory, the evolution of city, community and personal spaces, and the relations and constructions of class, race, gender, and sexuality that shape and are shaped by the urban spaces in which we live and work. *(Spring)*

GEOG 5405. Urban Field Geography. (6) Prerequisite: six hours of urban-related undergraduate courses or permission of instructor. Intensive field studies of cities of the Carolinas, including one-day and overnight trips to cities of the mountains and coastal areas. Emphasis on day study trips within the Piedmont. Exercises include land-use mapping, trip journals, interviews and comparisons of the results of zoning and urban development practices within satellite cities of the Charlotte Metropolitan Statistical Area. *(Summer)*

GEOG 6000. Topics in Economic Geography. (3) Cross-listed as GEOG 8000. Major topics in the location of economic activity. May be repeated for credit as topics vary. *(Yearly)* *(Evenings)*

GEOG 6005. Topics in Urban Geography. (3) Cross-listed as GEOG 8005. Major topics in the form and structure of urban areas examined generally and in a specific local occurrence. May be repeated for credit as topics vary. *(Yearly)* *(Evening)*

GEOG 6010. Topics in Political Geography. (3) Cross-listed as GEOG 8010. Major topics in the spatial aspects of political systems with special emphasis on urban and regional spatial patterns examined generally and in a specific

local occurrence. May be repeated for credit as topics vary. *(On demand)*

GEOG 6015. Topics in Regional Geography. (3) Intensive examination of major spatial questions in a given region. May be repeated for credit as topics vary. *(On demand)*

GEOG 6030. Topics in Geographic Techniques. (3)
Cross-listed as GEOG 8030. Cartographic, remote sensing, quantitative techniques or field techniques. May be repeated for credit as topics vary. *(On demand)*

GEOG 6100. Quantitative Methods in Geography. (3)
Cross-listed as GEOG 8100. Topic areas include multiple regression, trend surface, factorial analysis, cluster analysis, discriminant analysis. Emphasis on applied methods and skill development useful in geographic research. *(Fall)*
(Evenings)

GEOG 6103. Real Estate Development. (3) Examination of the real estate development process. Identification and evaluation of the critical assumptions and issues related to market and site feasibility, financial feasibility, planning, acquisition, construction, and operation of economically viable commercial real estate projects. *(Fall or Spring)*

GEOG 6105. Applied Real Estate Development. (3)
Prerequisite: MBAD 6159/GEOG 6103/ARCH 5068. This course focuses on the application of the processes involved in real estate development. Students will work in groups on a semester project to select a site and prepare an appropriate development plan that emphasizes the market and financial feasibility of the real estate development. *(Fall or Spring)*

GEOG 6120. Spatial Statistics. (3) Cross-listed as GEOG 8120. Prerequisite: GEOG 6100/8100, GEOG 6404/8404, or permission of the instructor. Statistical analysis of the spatial dimension of data. Topics include advanced aspects of spatial autocorrelation, global and local measures of spatial association, modifiable area unit problems, spatially weighted regression, and other spatial models. Emphasis on applying methods and developing skills useful in empirical research.

GEOG 6121. Advanced Seminar on Spatial Modeling. (3)
Cross-listed as GEOG 8121. Prerequisite: GEOG 5131, GEOG 5132, or permission of the instructor. This seminar focuses on the theories of spatial modeling and simulation. Topics include, but are not limited to, spatial systems, models for spatial analysis, models for spatial simulation, modeling life-cycle, model verification, validation, and accreditation. *(Fall)*

GEOG 6122. GIS&T and Urban Regional Analysis. (3)
Cross-listed as GEOG 8122. Prerequisite: permission of the instructor. This course focuses on the spatial thinking, spatial analytic methods and their GIS applications suited for urban and regional analyses. Modeling approaches include spatial interaction models, spatial optimization

methods, spatial diffusion, space-time modeling of individual behavior and integrated transportation land-use models. *(Fall)*

GEOG 6123. Urban Regional Environment. (3) Cross-listed as GEOG 8123 and PPOL 8610. Examination of the nature of urban regions and the basic factors that shape urban regions as they grow. Impact of: geography; history; social factors; economic factors; concerns about gender, race and ethnicity, and class; and other determinants of the nature of urban regions, their problems, and possible policy solutions. *(Spring)*

GEOG 6124. Seminar in Geographic Theory and Research Design. (3) Cross-listed as GEOG 8124. Prerequisite: permission of the instructor. Critical examination of trends in the history and philosophy of geographic thought and research. Principles of research in geography and urban regional analysis.

GEOG 6131. Research Design Fundamentals. (3) Cross-listed as GEOG 8131. Scientific research and problem solving. Problem identification, bibliographic search, data sources and collection, techniques selection and preparation of reports and proposals. *(Spring) (Evenings)*

GEOG 6132. Seminar in Geography. (3) Study of the current trends in geographic thought and research methods. Pass/Unsatisfactory grading. *(On demand)*

GEOG 6210. The Restructuring City. (3) Cross-listed as GEOG 8210 and PPOL 8615. Critical assessment of the causes and consequences of contemporary urban restructuring. Evaluation of theoretical, planning and policy challenges facing urban society associated with global-local change. *(Fall, Alternate years)*

GEOG 6211. Cities and Immigrants. (3) Cross-listed as GEOG 8211. Prerequisite: permission of the instructor. Examination of changing patterns and dynamics of immigrant settlement and adjustment in U.S. and Canadian urban areas. Topical areas include assimilation and integration, identity formation, trans-nationalism, enclave development, labor market involvement, gateway versus new destinations, immigrant suburbanization and socio-spatial isolation. *(Spring, Alternate years)*

GEOG 6212. Urban Labor Markets. (3) Cross-listed as GEOG 8212. Prerequisite: permission of the instructor. This course will explore the changing social and spatial structure of urban labor markets in post-industrialized cities. Special reference to immigrant and minority labor markets in the U.S. Topics include discrimination, industry and occupation concentrations, job queues, ethnic networks, ethnic entrepreneurs, technological change and economic restructuring.

GEOG 6213. Development Issues on the Rural-Urban Fringe. (3) Cross-listed as GEOG 8213. Prerequisite: permission of the instructor. This course focuses on

changes in the rural-urban fringe and the resulting fringe geographies including challenges that local and regional governments face with growth management, sense of place, and sustainable integration into their new regional settings.

GEOG 6300. Applied Regional Analysis. (3) Cross-listed as GEOG 8300. Prerequisite: Basic computer skills including spreadsheets. Introduction to methods and techniques used in regional analysis. Topical areas include data sources and collection, regional delineation, community and regional profiles, regional accounts, methods of analysis and impact assessment. Topics are discussed in terms of theory, use, and role in economic geography and regional development. Emphasis is placed on application of economic and demographic methods at the regional level. *(Fall, Alternate years)*

GEOG 6301. Industrial Location. (3) Cross-listed as GEOG 8301. Addresses factors influencing the location of industrial and service activities. Classical theories of industrial location are augmented with contemporary interpretations of the economic landscape. Emphasis is placed on theoretical foundations and new developments in industrial location theory, patterns and trends of industrial location, the site selection process, community impacts of locational decision-making, and the role of governments. Patterns and trends are examined in regional, national, and international perspectives. *(Fall, Alternate years)*

GEOG 6302. Regional Economic Development. (3) Cross-listed as GEOG 8302 and PPOL 8642. Neo-classical and contemporary theories of trade, economic geography and urban and regional development. Topics include theories of urban and regional growth, location theories including industry, central places and growth centers; human capital, labor force and entrepreneurial contributions to growth; policy dimensions of urban growth and development are addressed from theoretical and empirical perspectives. *(Fall)*

GEOG 6303. Geography of Knowledge and Information. (3) Cross-listed as GEOG 8303. Prerequisite: permission of the instructor. Examination of the factors that influence the location of economic activities in the information age. Discussions and lectures explore the geographic aspects of the transition away from manufacturing to information processing as the primary mode of production. The transition is examined in terms of technology development, urban and regional development, information flows and the location of quaternary industry. *(Fall, On demand)*

GEOG 6304. The Transforming North Carolina Economy. (3) Cross-listed as GEOG 8304. Prerequisite: permission of the instructor. An examination of the contemporary and historic forces which shape the economic geography of the state. Themes examined will include human-land interactions, past and present economic transitions and the rural-urban balance within the state. Emphasis will be placed on understanding the economic

forces which will most dramatically impact the future. Seminar format.

GEOG 6305. Site Feasibility Analysis. (3) Cross-listed as MBAD 6258. Prerequisite: permission of instructor. Examination of factors affecting the feasibility of land parcels for commercial and residential development with emphasis on the physical evaluation of a given site, the market support for its intended use and the financial support for the proposed development. *(Fall)*

GEOG 6306. Store Location Research. (3) Prerequisite: GEOG 6100 or permission of instructor. Market area analysis and site evaluation methods, including the application of multivariate statistical models, spatial interaction-gravity models, and location-allocation techniques to the retail location analysis task. *(Spring)*

GEOG 6400. Advanced Seminar in Spatial Decision Support Systems (SDSS). (4) Cross-listed as GEOG 8400 and PPOL 8642. Prerequisite: GEOG 5120 or permission of instructor. Theoretical aspects of spatial DSS including technical, social, political and psychological consideration; systems design; systems manipulation; and case studies. Three hours of lecture and one two-hour lab per week. *(Fall)*

GEOG 6401. GIS Programming and Customization. (3) Cross-listed as GEOG 8401. Prerequisite: GEOG 4120/5120 or permission of the instructor. This course consists of tutorials, readings, projects, and discussions of how to customize and to program ArcObjects within various programming environments: to program automatic repetitive tasks, to build their own applications, to write geoprocessing scripts, and to develop and customize the Web applications.

GEOG 6402. Multi-Attribute Assessment/Evaluation for Planning & Decision-Making. (3) Cross-listed as GEOG 8402. Prerequisite: permission of the instructor. The course provides a survey and comparison of multi-attribute assessment and evaluation methods in spatial planning and decision-making; and discusses the implementation of these methods with the aid of geographic information techniques. Topics include land suitability/vulnerability assessment, environmental and social impact assessment, risk assessment, site selection, plan evaluation, and multi-criteria decision analysis. *(Spring)*

GEOG 6404. Spatial Data Analysis in GIS. (3) Cross-listed as GEOG 8404. Prerequisite: GEOG 5120 or permission of the instructor. Advanced analytical methods used in GIS and spatial data analysis to advance the understanding of spatial patterns and to invoke powerful principles of spatial thinking. Examination of theoretical and conceptual aspects of algorithms used in GIS software to analyze spatial data. Critical assessment of the use, misuse, abuse and limitations of GIS analytical techniques.

GEOG 6405. Three Dimensional Visualization. (3) Cross-listed as GEOG 8405. Prerequisite: GEOG 4130/5130 or permission of the instructor. This course consists of tutorials, readings, projects, and discussions concerned with how geo-visualization techniques can be used to display geographic information driven from spatial analyses in 3D GIS. Students who successfully complete the course are able to understand advanced geographic information systems, focusing on multi-dimensional data models and three-dimensional geo-visualization as spatial analyses tools. In addition, students work on independent and group projects to develop 3D GIS applications such as 3D Urban Simulation System using existing 3D GIS and visualization software.

GEOG 6500. Urban Planning: Theory and Practice. (3) Cross-listed as GEOG 8500 and PPOL 8616. Critical assessment of alternative planning theories and their application to planning practices. Examination of economic, political, social, cultural and geographical factors affecting the operations of cities and resource distribution. *(Alternate years)*

GEOG 6501. Community Planning Workshop. (3) Cross-listed as ARCH 6050. Problem-solving, client-based course designed to give students experience in applying planning theory and methods to actual problems. Types of problems include growth management, land use planning, regional planning, community development, urban design, infrastructure financing, economic development, and environmental management. Students will gain experience compiling and analyzing community scale data, working with citizens, professional planners, and elected officials and preparing oral reports and technical documents. The workshop setting will build upon and extend conventional classroom instructions. *(Fall)*

GEOG 6600. Transportation Policy. (3) Cross-listed as GEOG 8600 and PPOL 8613. Examination of surface transportation from a public policy perspective. Institutional components and role of government at all levels influencing investment; changes in technology, environment, security, safety, equity, cost-effectiveness, public health and welfare are covered. *(Fall)*

GEOG 6612. Advanced Geography of Transportation Systems. (3) Cross-listed as GEOG 8612. Prerequisite: GEOG 6100/8100 or permission of the instructor. Exploration of transportation systems from a geographic perspective. The course emphasizes the importance of these systems in the past, present and future. The course explores the relationships between the organization of the space economy and transportation, the flow of people, commodity and ideas at different scales of observation from the small picture (urban transportation) to the big, global picture (international transportation), mobility issues in everyday life and in the economy. The social, economic, physical, and political contexts of transportation systems are discussed. The course is also designed to develop analytical capabilities

by using a few fundamental techniques of transportation planning and analysis.

GEOG 6643. Rural Development Issues. (3) Cross-listed as GEOG 8643. Prerequisite: Permission of the instructor. This course provides research experiences that focus on policy formulation, and demographic, economic and planning issues in rural areas. *(Fall)*

GEOG 6800. Directed Problems in Geography. (1-4) Cross-listed as GEOG 8800. Individual research into geographic topics. May be repeated one time. *(On demand)*

GEOG 7900. Individual Research Project. (6) Individual research report based on directed study of a topic of geographic significance. Pass/Unsatisfactory grading. *(Fall, Spring)*

GEOG 7999. Master's Degree Graduate Residency Credit. (1) Permission needed from department. *(Fall, Spring, Summer)*

COURSES IN GEOGRAPHY AND URBAN REGIONAL ANALYSIS

GEOG 8100. Quantitative Methods in Geography. (3) Cross-listed as GEOG 6100. Topics areas include multiple regression, trend surface, factorial analysis, cluster analysis, discriminant analysis. Emphasis on applying methods and developing skills useful in empirical research. *(Fall Evenings)*

GEOG 8120. Spatial Statistics. (3) Cross-listed as GEOG 6120. Prerequisite: GEOG 6100/8100, GEOG 6404/8404, or permission of the instructor. Statistical analysis of the spatial dimensions of data. Topics include advanced aspects of spatial autocorrelation, global and local measures of spatial association, modifiable areal unit problems, spatially weighted regression, and other spatial models. Emphasis on applied methods and skill development useful in geographic research. *(Spring Evenings)*

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methods, spatial diffusion, space-time modeling of individual behavior and integrated transportation land-use models. *(Fall)*

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political, social, cultural and geographical factors affecting the operations of cities and resource distribution. (*Alternate years*)

GEOG 8600. Transportation Policy. (3) Cross-listed as GEOG 6600 and PPOL 8613. Examination of surface transportation from a public policy perspective. Institutional components and role of government at all levels influencing investment; changes in technology, environment, security, safety, equity, cost-effectiveness, public health and welfare are covered. (*Fall*)

GEOG 8612. Advanced Geography of Transportation Systems. (3) Cross-listed as GEOG 6612. Prerequisite: GEOG 6100/8100 or permission of the instructor. Exploration of transportation systems from a geographic perspective. The course emphasizes the importance of these systems in the past, present and future. The course explores the relationships between the organization of the space economy and transportation, the flow of people, commodity and ideas at different scales of observation from the small picture (urban transportation) to the big, global picture (international transportation), mobility issues in everyday life and in the economy. The social, economic, physical, and political contexts of transportation systems are discussed. The course is also designed to develop analytical capabilities by using a few fundamental techniques of transportation planning and analysis.

GEOG 8643. Rural Development Issues. (3) Cross-listed as GEOG 6643. Prerequisite: Permission of the instructor. This course provides research experiences that focus on policy formulation, and demographic, economic and planning issues in rural areas. (*Fall*)

GEOG 8800. Directed Problems in Geography. (1-4) Cross-listed as GEOG 6800. Individual research into geographic topics. May be repeated one time. (*On demand*)

GEOG 8901. Dissertation (1-9)

GEOG 9999. Doctoral Degree Graduate Residency Credit. (1)

Gerontology

- M.A. in Gerontology
- Certificate in Gerontology

Gerontology Program

704-687-6205

<http://gerontology.unc.edu>

Director and Coordinator

Dr. Dena Shenk

Graduate Faculty

Anita Blowers, Associate Professor of Criminal Justice
 Bill Brandon, Metrolina Medical Foundation Distinguished Professor of Public Policy in Health
 Maren Coffman, Assistant Professor of Nursing
 Boyd Davis, Bonnie E. Cone Professor of Teaching, Professor of English
 Christine Davis, Assistant Professor of Communication Studies
 Mark Faust, Assistant Professor of Psychology
 Meredith Flood, Assistant Professor of Nursing
 Paul Foos, Professor of Psychology
 Cynthia Hancock, Lecturer, Department of Sociology
 Martin Kane, Associate Professor of Civil and Environmental Engineering
 James Laditka, Associate Professor of Public Health Sciences
 Sarah Laditka, Associate Professor of Public Health Sciences
 JoAnn Lee, Associate Professor of Psychology
 Julie McLaughlin, Assistant Professor of Sociology
 Linda Moore, Associate Professor of Adult Health Nursing
 Trudy Moore-Harrison, Postdoctoral Fellow
 Louise Murray, Adjunct Professor, Gerontology Program
 Jane Neese, Associate Dean for Academic Affairs, College of Health and Human Services
 Amy Peterman, Associate Professor of Psychology
 Blanca Ramos, Associate Professor of Social Work
 Dorothy Ruiz, Associate Professor of Africana Studies
 Rachel Seymour, Coordinator, Aging Research Services, Adjunct Faculty, Gerontology
 Dena Shenk, Professor of Anthropology
 Jamie Strickland, Lecturer, Geography and Earth Sciences
 Rosemarie Tong, Mecklenburg County Medical Society Distinguished Professor
 Jennifer Troyer, Associate Professor of Economics
 Michael Turner, Associate Professor of Kinesiology
 Jan Warren-Findlow, Assistant Professor of Public Health Sciences
 Diane Zablotsky, Associate Dean, College of Liberal Arts and Sciences

MASTER OF ARTS IN GERONTOLOGY

The Master of Arts in Gerontology is designed to prepare graduates with the knowledge and skills to fill a wide variety of positions in the developing field of aging. Interdisciplinary Gerontology courses integrate materials from various disciplines. Multidisciplinary Gerontology courses are also included, requiring students to study aging from a variety of disciplinary perspectives. The core of essential materials included in the required courses are augmented by the selection of elective courses in an individually designed program for each student. Students work with their advisor to develop a program that will best prepare them to meet their goals.

Potential students are encouraged to apply to begin the program in the fall semester, although applications are reviewed throughout the year. The program can be completed on either a full-time or part-time basis with all required courses and a selection of electives offered in the evening. Some courses may require prerequisites and it is the responsibility of the candidate to meet any prerequisites (e.g., statistics is a required prerequisite for GRNT 6201). Students will work in conjunction with their advisor and graduate committee to design and implement their individual program.

Additional Admission Requirements

- Grade point average (GPA) of at least 2.75 overall and 3.0 in courses in Gerontology
- Satisfactory GRE or MAT scores
- Three letters of recommendation from persons familiar with the applicant's personal and professional qualifications
- An essay is required describing the applicant's relevant experience and objectives in undertaking graduate study in Gerontology

Prerequisite Requirements

Completion of at least one broad-based undergraduate course in Gerontology or the Professional Development Program in Gerontology previously offered through the Office of Continuing Education, Extension and Summer Sessions at UNC Charlotte.

Degree Requirements

The Gerontology Program requires a minimum of 36 semester hours of graduate course work.

Core Courses (required, 21 hours)

- GRNT 6124/PSYC 6124 Psychology of Aging (3)
- GRNT 6130/SOCY 6130 Sociology of Aging:
Theories and Research (3)
- GRNT 6201 Research and Methods in Aging I (3)
- GRNT 6202 Research and Methods in Aging II (3)
- GRNT 6400 Practicum (3)
- GRNT 6600 Current Issues in Gerontology (3)
- GRNT 6275/NURS 6275 Health Promotion and
Wellness for Older Adults – OR– HPKD
5232 Physiology of Human Aging (3)

In addition to these core courses, each student will complete either a thesis (GRNT 6999) or an applied project (GRNT 6990).

Elective courses include the following:

- CSLG 7681 Grief and Loss (3)
- EIST 6101 The Adult Learner (3)
- GRNT 5050 Topics in Gerontology (1-4)
- GRNT 5134 Families and Aging (3)
- GRNT 5150 Older Individual and Society (3)
- GRNT 5250 Programs and Services for the Aging (3)
- GRNT 5260 Women: Middle Age and Beyond (3)

- GRNT 5270 Intergenerational Relationships &
Programs
- GRNT 6210/MPAD 6210 Aging and Public Policy
(3)
- GRNT 6211/MPAD 6211 Administration of Aging
Programs (3)
- GRNT 6800 Independent Research Study (3) *(can be
repeated, up to 6 credits can be counted
towards MA electives)*
- MPAD 6128 Foundations of Public Policy (3)
- MPAD 6172 Admin of the Health Care System in the
U.S. (3)
- NURS 6115 Health Planning in the Health Care
System (3)

Other electives may be selected in consultation with your advisor.

Comprehensive Examination

Each student will complete an oral comprehensive exam at the time of the thesis or applied project proposal defense.

Committee

Each student should select his/her Graduate Committee before completion of GRNT 6201.

Thesis or Applied Project

The thesis option entails 9 hours of elective credits and 6 hours of thesis credits (GRNT 6999).

The student must also pass an oral defense of both the thesis proposal and thesis, and oral comprehensive exams at the time of the thesis proposal defense.

The applied project option generally entails 12 hours of elective credits and 3 hours of applied project credits (GRNT 6990).

The student must also pass an oral defense of both the applied project proposal and the project, and oral comprehensive exams at the time of the project proposal defense.

Financial Aid/Financial Assistance

The program offers the NMR Gerontology Graduate Scholarship annually with all application materials due by June 1.

Early Entry Program

Exceptional undergraduate students may be accepted into the master's of Gerontology and begin work toward a graduate degree before completion of the baccalaureate degree.

GRADUATE CERTIFICATE IN GERONTOLOGY

The Graduate Certificate in Gerontology is designed to provide graduate education in Gerontology for those who already have a graduate degree in another field or those currently completing a graduate degree in another field, who are interested in working with older adults. It requires completion of a set of core and elective courses related to the study of aging. Applications for admission the Graduate Certificate Program in Gerontology are considered as they are received and admissions are ongoing. Students are admitted to the Graduate School in a special category for certificate students.

Additional Admission Requirements

In addition to the general requirements for admission to a certificate program, applicants must provide:

- Official transcripts of all baccalaureate and graduate work attempted
- Three letters of recommendation are required from persons familiar with the applicant's professional and personal qualifications
- An essay is required describing the applicant's relevant experience and objectives in undertaking graduate study in Gerontology

Degree Requirements

The Graduate Certificate Program requires completion of a minimum of 15 semester hours of graduate course work related to aging and older adults.

Core Course

GRNT 6600 Current Issues in Gerontology (3)

Electives

Primary Electives (choose at least one course from each of the following groups):

- 1.) GRNT/NURS 6275 Health Promotion and Wellness for Older Adults (3)
HPKD 5232 Physiology of Human Aging (3)
- 2.) GRNT/PSYC 6124 Psychology of Aging (3)
GRNT/SOCY 6130 Sociology of Aging:
Theories of Research (3)
- 3.) GRNT 6400 Practicum (3) (Students who do not have experience working with older adults are strongly encouraged to complete a practicum)

Secondary Electives (choose 1-2 from the following):

- CSLG 7681 Grief and Loss (3)
- EIST 6101 The Adult Learner (3)
- GRNT 5050 Topics in Gerontology (1-4)
- GRNT 5134 Families and Aging (3)
- GRNT 5150 Older Individual and Society (3)
- GRNT 5250 Programs and Services for the Aging (3)
- GRNT 5260 Women: Middle Age and Beyond (3)

GRNT 5270 Intergenerational Relationships & Programs (3)

GRNT 6210/MPAD 6210 Aging & Public Policy (3)

GRNT 6211/MPAD 6211 Admin of Aging Programs (3)

HPKD 5232 Physiology of Human Aging (3)

MPAD 6128 Foundations of Public Policy (3)

MPAD 6172 Admin of the Health Care System in the U.S. (3)

NURS 6115 Health Planning in the Health Care System (3)

Secondary electives may also be chosen from other appropriate courses as offered with the approval of the Gerontology Graduate Coordinator.

Transfer Credit

Transfer credit is not accepted toward a Graduate Certificate Program in Gerontology.

COURSES IN GERONTOLOGY

GRNT 5050. Topics in Gerontology. (1-4) Investigation of specific issues in Gerontology, either from the perspective of a single discipline or from a multidisciplinary perspective. May be repeated for credit as topics vary. (*On demand*)

GRNT 5134. Families and Aging. (3) Theories explaining the formation and functioning of American families with emphasis on the impact of the aging of society. Examination of the current demographic trends and expectations of multigenerational families, as well as the future demands and modifications. (*Yearly*)

GRNT 5150. Older Individual and Society. (3) Study of the social and cultural context on the lives of aging individuals in American society. Will include a focus on expectations, social interactions, and psychological well-being in the context of retirement, caregiving, and health (*Yearly*)

GRNT 5250. Aging Programs and Services. (3) Examination of federal, state and local framework of services and programs for the aging. Graduate students required to complete a more extensive final paper. (*On demand*)

GRNT 5260. Women: Middle Age and Beyond. (3) Position of older women in society and the particular problems and issues for women as they age. (*On demand*)

GRNT 5270. Intergenerational Relationships & Programs. (3) Exploration of the importance of and consequences of intergenerational relationships and the range of programming currently available to encourage interaction between people of different ages. (*On demand*)

GRNT 6050. Topics in Gerontology. (3) Permission needed from program.

GRNT 6124. Psychology of Aging. (3) Psychology of aging with particular emphasis on issues related to community / clinical psychology and industrial / organizational psychology. Topics include myths and stereotypes about aging, problems faced by older workers, retirement, mental health and normal aging, counseling the older adult, and psychological disorders in later life. *(Fall)*

GRNT 6130. Sociology of Aging: Theories and Research. (3) Application of stratification theories and demography are applied to the older population. Issues of race, gender, socio-economic status, age, and geographic distribution are examined to investigate the diversity of the older age group and their access to resources. *(Yearly)*

GRNT 6201. Research and Methods in Aging I. (3) Prerequisite: Statistics. Examination of variety of qualitative and quantitative methods used in research on aging and analysis of Gerontology research from a range of disciplines. Students will develop a working draft of their thesis-applied project proposal. *(Fall)*

GRNT 6202. Research and Methods in Aging II. (3) Prerequisite: GRNT 6201. Examination of the variety of qualitative and quantitative methods used in evaluation research in applied settings. Students will develop an evaluation project plan. *(Spring)*

GRNT 6210. Aging and Public Policy. (3) Examination of the public policy making process with attention to aging policy. Consideration of determinants of aging policy and institution and actors in the policy making process and piecemeal development of legislation will be analyzed as factors related to the making of policy for the aged. *(Alternate years)*

GRNT 6211. Administration of Aging Programs. (3) Focus will be implementation of public policies and programs for the aged and the development and administration of these programs. Students will become familiar with the process through which policies are transformed into aging programs and the budgetary, management and evaluative considerations that must be taken into consideration. *(Alternate years)*

GRNT 6238 Intergenerational Issues of Justice. (3) Cross-listed as PHIL 6238. Examination of intergenerational issues of justice in public policy toward the elderly and their health care needs. Issues of justice and morality will be explored in terms of the distribution of limited health care resources among competing age groups. *(On demand)*

GRNT 6275. Health Promotion and Wellness for Older Adults. (3) Cross-listed as NURS 6275. Self-care measures and health promotion practices to promote a healthy lifestyle are discussed. Included are principles of teaching and learning adapted to the older client needed by health care and other professionals who teach and plan programs for the older client. Common barriers to health care of older adults are examined.

GRNT 6400. Practicum. (3) Completion of a field-based educational experience which relates to the student's career goals and objectives. Pass/Fall grading. *(Summer)*

GRNT 6600. Current Issues in Gerontology. (3) Study of current topics and issues in the field of Gerontology from an interdisciplinary perspective. An ethical framework will be used to examine the issues. *(Fall)*

GRNT 6800. Independent Research in Gerontology. (3) Graduate students meet individually or in small groups with the instructor and will complete readings and/or research on a topic in gerontology according to a contract. Attendance at lectures of an undergraduate class in Gerontology may be included among course requirements. May be repeated for credit up to a maximum of six hours. *(On demand)*

GRNT 6990. Applied Project. (3) Permission needed from program. Pass/Fail grading. *(Fall, Spring, Summer)*

GRNT 6999. Master of Arts Thesis. (3 or 6) Prerequisite: application for admission to the thesis option. A completed paper and oral presentation are required. Pass/Fail grading. *(Fall, Spring, Summer)*

GRNT 7999. Master's Degree Graduate Residency Credit. (1) *(Fall, Spring, Summer)*

History

- **M.A. in History**

Department of History

226 Garinger
704-687-4633
<http://history.uncc.edu>
<http://publichistory.uncc.edu>

Coordinator

Dr. Gregory Mixon

Director of Public History

Dr. Karen Cox

Graduate Faculty (UNC Charlotte)

Benny Andres Assistant Professor
Cemil Aydin, Associate Professor
Jurgen Buchenau, Professor
Karen Cox, Associate Professor
Jerry Dávila, Associate Professor
Daniel Dupre, Associate Professor, Interim Chair, History
Karen Flint, Associate Professor
David Goldfield, Professor

Christine Haynes, Assistant Professor
 James Hogue, Associate Professor
 Lyman Johnson, Professor
 Haiyun Ma, Assistant Professor
 Gregory Mixon, Associate Professor
 Daniel Morrill, Professor
 Akin Ogundiran, Professor and Chair, Africana Studies
 Heather Perry, Assistant Professor
 Amanda Pipkin, Assistant Professor
 Alan Rauch, Associate Professor, English
 Sonya Ramsey, Associate Professor
 Julia Harmon-Robinson, Assistant Professor, Religious Studies
 Thomas Rogers, Assistant Professor, Africana Studies
 Steven Sabol, Associate Professor
 John Smail, Professor and Dean of University College
 John David Smith, Professor
 Robert Smith, Associate Professor, Africana Studies
 Heather Thompson, Associate Professor
 Peter Thorsheim, Associate Professor
 Jonathan Wells, Associate Professor, Director, Center for the Study of the New South
 Mark Wilson, Associate Professor

MASTER OF ARTS IN HISTORY

The Master of Arts Program in History at UNC Charlotte is designed to give motivated students an opportunity to pursue advanced studies in close collaboration with accomplished scholars. The program emphasizes the development of methodological, literary, and conceptual skills that graduates can employ as students in a doctoral program, as professionally oriented history teachers in secondary schools, as staff at museums or historic sites, or as citizens more acutely aware of the historical evolution of their society. Offering both day and evening courses, the Department of History attracts a diverse group of traditional and non-traditional students. Candidates may pursue the M.A. degree in History or Public History on either a full-time or part-time basis.

The Department offers courses in African, Asian, European, Latin American, and United States history, with particular expertise in the following areas:

- African-American and Black Women's History
- American South, Old and New
- Colonial and Modern Latin America
- Comparative Slavery, Race and Race Relations, and the African Diaspora
- Environmental, Labor and Business, Science, Medicine, and Technology,
- Military War and International Relations
- Modern Asia, Islamic World, and Central Asia
- Modern Europe, Ancient, Medieval, Early Modern
- Nationalism in World History, Colonialism, Holocaust, Genocide, and Human Rights
- Public History

- Urban, Immigration, and Ethnicity
- Women's History, Gender and the Body

The Department also offers a concentration in the field of Public History under the directorship of Dr. Karen Cox. The program emphasizes museum studies, historic preservation, and the creation of new media projects such as websites, digital collections, and documentaries.

Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are ordinarily required for admission to the M.A. program in History:

- 5) A minimum undergraduate GPA of 3.0 in History or a related discipline
- 11) Acceptable performance on the verbal and math portions of the GRE.

Degree Requirements

The Master of Arts degree in History requires completion, with a GPA of 3.0 or better, of at least 30 hours in approved graduate courses. These courses must include at least 24 credit hours in History, of which at least 15 hours are in seminars or colloquia open only to graduate students, and no more than 6 hours in individually designed readings or research courses (seminars and tutorials). Students taking the comprehensive examination may take 3 hours of exam preparation and students completing a thesis may take 6 hours of thesis preparation toward their 30 hours.

Students who pursue the concentration in Public History must complete 30 hours of required and elective coursework, 3 hours for an internship in some area of Public History, and 3 hours of thesis work for a total of 36 hours.

Students must complete all degree requirements, including the comprehensive examination or thesis defense, within six calendar years of first enrollment in the program.

All students in the program are expected to maintain an overall B (3.0) average. Students who do not meet this expectation will be subject to suspension on recommendation of the Graduate Committee of the Department of History.

Admission to Candidacy Requirements

An Admission to Candidacy form must be submitted during the semester preceding the one in which the student plans to complete the degree requirements, either by defending a thesis or taking a comprehensive examination.

Assistantships

The Department of History supports eight students with teaching assistantships, two students with editorial assistantships, and occasionally provides support for other students via administrative assistantships. Assistantships are funded at \$9,000 per academic year. From time to time, the

Department also provides students with other employment opportunities.

See the sections on Tuition Waivers and Financial Assistance below for additional information on resources available to graduate students in the Department of History.

Internships

Internships are available to all students and required for those in the Public History program. Graduate students have done internships with the Charlotte-Mecklenburg Historic Landmarks Commission and the *Journal of Urban History*, both of which are headed by members of the Department, and with a variety of local historical museums and sites. Students also may serve as research assistants for members of the Department of History. See the Graduate Coordinator or the Director of Public History for internship opportunities or visit <http://publichistory.uncc.edu>.

Core Courses

Required courses for the M.A. in History are as follows:

- HIST 6693 (to be taken in the first year)
- 3 different HIST colloquia (choose from U.S. I, U.S. II, modern Europe and/or Colonial or Modern Latin America)
- 1 seminar

Candidates pursuing the concentration in Public History must complete *only 2 different HIST colloquia*. In addition, however, they also must complete the following core courses:

HIST 6310 History Museums
 HIST 6320 Historic Preservation
 HIST 6330 History in the Digital Age

Consult the department website at <http://history.uncc.edu> for more detailed description of program requirements and suggested courses of study.

Electives

Students may elect to take up to 6 hours of graduate-level course work in disciplines other than History. Candidates seeking graduate-level teacher certification may use the elective option to take courses in professional education selected in consultation with the College of Education. If a student needs more than 6 hours to satisfy certification requirements, those hours will be added to the total required for the M.A. in History.

Advising

Students may not register for graduate-level courses without the permission of the Department of History. Consequently, students must be advised by the Graduate Coordinator, either in person or by phone or email, prior to registering for courses each semester, as well as prior to filing their admission to candidacy form and application for degree.

Transfer Credit

No more than 6 transferred hours may be approved for application to the requirements for the degree.

Language Requirement

Although students are not required to demonstrate proficiency in a foreign language, they are expected to be able to use whatever languages they need to pursue their research interests.

Thesis/Comprehensive Examination

After completing the required courses, students must either prepare a Master's thesis based on original primary research or take three comprehensive written examinations based on reading lists compiled in consultation with faculty members. Students intending to write theses must first write and then defend a thesis proposal. M.A. candidates completing either the thesis or exam must then pass an oral defense of their written work.

An Examining Committee, consisting of two graduate faculty members from the Department of History and a third member selected from History or another department, oversees the student's thesis work or conducts the comprehensive written and oral examinations.

Tuition Waivers

The Department has two tuition waivers that enable out-of-state students to pay tuition at the in-state rate. There is also a modest pool of scholarship money for in-state students. The Department awards all waivers and scholarship money on a strictly competitive basis.

Financial Aid/Financial Assistance

Students may obtain limited financial support from paid internships, summer teaching in the Department, archival work in the library's Special Collections, and teaching opportunities at local community colleges. Students doing thesis research or presenting papers at professional conferences may receive modest travel grants from the Department or from the Graduate History Association.

Information on non-departmental forms of financial assistance is available from the UNC Charlotte Office of Student Financial Aid.

COURSES IN HISTORY

HIST 5000. Problems in American History. (3)

Prerequisite: HIST 2100 or permission of the department. A colloquium designed around a problem in American history, requiring reading, discussion, reports and a major paper. May be repeated for credit as topics vary. (*Fall, Spring*) (*Evenings*)

HIST 5001. Problems in European History. (3)

Prerequisites: HIST 2100 or permission of the department. A colloquium designed around a problem in European

history, requiring reading, discussion, reports and a major paper. May be repeated for credit as topics vary. (*Yearly, Summer*) (*Evenings*)

HIST 5002. Problems in Non-Western History. (3)

Prerequisite: HIST 2100 or permission of the department. A colloquium designed around a problem in non-Western history, requiring reading, discussion, reports and a major paper. May be repeated for credit as topics vary. (*Yearly*)

HIST 5300. Introduction to Public History. (3)

Prerequisite: permission of the department. This course will provide an overview of the main subfields in the field of Public History. Students will learn the fundamentals of Museum Studies, Historic Preservation, and other fields at the discretion of the instructor. This course is the first in a sequence of required courses for graduate students doing the Public History concentration; it is also open to advanced undergraduates with the permission of the department. (*Yearly*)

HIST 6000. Topics in History. (3) Prerequisite: permission of the department. Intensive treatment of a period or broader survey of a topic, depending on student needs and staff resources. May be repeated for credit as topics vary. (*Fall, Spring*) (*Evenings*)

HIST 6151. Colloquium on Colonial Latin American History. (3) Cross-listed as LTAM 6151. Prerequisite: permission of the department. A topical colloquium devoted to selected themes in colonial Latin American history. This course provides an introduction to research methods, documentary sources, and the critical analysis of historical literature. Topics will change. Course may be repeated for credit. (*Alternate years*)

HIST 6152. Colloquium in Modern Latin American History. (3) Cross-listed as LTAM 6252. Prerequisite: permission of the department. A topical colloquium devoted to selected themes in modern Latin American history. This course provides an introduction to research methods, documentary sources, and the critical analysis of historical literature. Topics will change. Course may be repeated for credit. (*Alternate years*)

HIST 6196. Urban Systems for School Administrators. (3) Corequisite: POLS 6196. An interdepartmental, team-taught course which consists of a survey of the causes and consequences of urbanization in the United States with particular attention to the urban South. Urbanization is treated as a system linking historic, political, economic, and social factors, particularly since 1945. (*Summer*)

HIST 6200. History Teaching Alliance Institute. (3) Open under special arrangement. Pass/Unsatisfactory grading only. (*On demand*)

HIST 6210. Early America, 1607-1820. (3) Prerequisite: permission of the department. Development of American institutions from the period of English settlement through

the establishment of Republicanism under the Constitution. (*Alternate years*)

HIST 6215. Jacksonian America, 1820-1848. (3)

Prerequisite: permission of the department. Examination of important economic, social and political changes including industrialization, the rise of the Democratic Party and reform movements. (*Alternate years*)

HIST 6220. The Old South. (3) Prerequisite: permission of the department. Evolution of the Old South from the 17th century to its collapse in the Civil War and Reconstruction, focusing on southern distinctiveness and the tension between democracy and slavery. (*Alternate years*)

HIST 6225. The New South. (3) Prerequisite: permission of the department. Continuity and change in the South from the late-19th century, including industrialization, politics, class and race relations, and religion. (*Alternate years*)

HIST 6230. European Social History. (3) Prerequisite: permission of the department. Examination of the views of different writers on class formation, the rise of modern institutions, gender relations and social protest including why certain schools of thought such as modernization or Marxism become popular at particular historical moments. (*Alternate years*)

HIST 6240. U.S. Political and Economic History, 1865-1939. (3) Prerequisite: permission of the department. Emergence of the modern industrial economy and the concomitant development of a large bureaucratic federal government including big business, technological innovation, the labor movement, progressive reform and regulatory policies. (*Alternate years*)

HIST 6250. Comparative Slavery and Race Relations. (3) Cross-listed as LTAM 6250. Prerequisite: permission of the department. Slavery in the New World through its abolition including Indian and African slaves, the slave trade, the economics of slavery, and the impact of slavery on modern race relations in the Americas. (*Alternate years*)

HIST 6265. Cold War America. (3) Prerequisite: permission of the department. Domestic and foreign policy problems accompanying the post-World War II struggle between East and West, Communism and capitalism including McCarthyism, modern technology, foreign aid, Korea, Vietnam, civil rights, gender roles and natural resources. (*Alternate years*)

HIST 6310. History Museums. (3) Prerequisite: permission of the department. This course introduces students to the management, curatorial, public relations, and fundraising aspects of historical museums and related historical sites. These skills will be acquired through readings, term projects, and a "hands-on" experience at local museums and historical sites. (*Yearly*)

HIST 6320. Historic Preservation. (3) Prerequisite: permission of the department. This course is an introduction to the theory and practice of identifying, preserving and restoring buildings, sites, structures and objects in the historic built environment of the United States. (*Yearly*)

HIST 6330. History in the Digital Age. (3) Prerequisite: permission of the department. This course analyzes the impact of new media technology on the discipline of history as well as the ways in which new media enhances the discipline by making history accessible to a much broader audience. This course will involve an individually-based new media project that will require students to learn to work as a team, important to their preparation for careers in public history settings. Coursework includes common readings of texts and encounters with on-line studies, with emphasis on students' individual media projects. (*Yearly*)

HIST 6601. Graduate Colloquium. (3) Prerequisite: permission of the department. A colloquium focused on a theme or period. Assigned readings, short papers and reports directed toward developing research and writing skills. May be repeated for credit. (*Fall, Spring*) (*Evenings*)

HIST 6693. Historiography and Methodology. (3) Prerequisite: permission of the department. A study of historians and their philosophical and methodological approaches. Required of all M.A. candidates. (*Yearly*) (*Evenings*)

HIST 6698. Introduction to Historical Writing. (3) Prerequisite: permission of the department. Seminar on the process of thesis writing including thesis proposals, primary source materials, rules of evidence, structure of an argument, and organization of the thesis and its chapters. May be repeated for credit. (*On demand*)

HIST 6894. Readings in History. (3) Prerequisite: prior written permission of instructor. Coverage of historical periods or topics through individually designed reading programs; scheduled conference with a staff member. May be repeated for credit. (*Fall, Spring*) (*Evenings*)

HIST 6901. Directed Readings/Research. (3) Prerequisite: prior written permission of instructor and graduate coordinator. Graduate students will meet individually or in small groups with the instructor and will be assigned readings and/or research on a theme that relates to the lectures of an undergraduate class. Attendance at the lectures is a course requirement. May be repeated for credit. (*Fall, Spring, Summer*)

HIST 6997. Directed Research. (3) Prerequisite: prior written permission of instructor. Investigation of a historical problem culminating in a research paper. May be repeated for credit. (*On demand*)

HIST 6999. Thesis. (3 or 6) May be repeated by permission, if taken for three hours credit. Six hours of

Thesis may be taken during a single semester. Appropriate research and written exposition of that research is required. (*On demand*)

HIST 7999. Master's Degree Graduate Residency Credit. (1)

HIST 8894. Readings in History. (3 or 6) Prerequisite: doctoral student with prior written permission of the instructor. Coverage of historical periods or topics through individually designed reading programs; scheduled conferences with a designated member of the graduate faculty. May be repeated for credit. (*Fall, Spring, Summer*)

HIST 8999. Dissertation. (3 or 6) Prerequisite: approval of dissertation topic by the student's advisory committee. Individual research that culminates in the preparation and presentation of a doctoral dissertation. May be repeated by presentation up to 12 hours. Six hours of Dissertation may be taken during a single semester. Maximum of 12 hours allowed under this course designation. (*On demand*)

HIST 9999. Doctoral Degree Graduate Residency Credit. (1) Maintains continuous enrollment as required by University policy. (*On demand*)

Latin American Studies

- **M.A. in Latin American Studies**

Program Director

Dr. Jurgen Buchenau

www.latinamericanstudies.uncc.edu

MASTER OF ARTS IN LATIN AMERICAN STUDIES

The program in Latin American Studies leading to the Master of Arts degree provides students with the skills and knowledge to understand and analyze the societies of Latin America and the Caribbean—a region of key importance in the age of globalization and mass migration. The program will provide an excellent foundation for advanced graduate study in the humanities, social sciences, and law. It is also designed to prepare the growing number of students who seek careers in the foreign service and other government agencies as well as those who will seek employment in non-governmental organizations with an international or cross-cultural orientation or in international business. Finally, it will also serve as an important qualification for individuals in education and the social services who work with the burgeoning Hispanic population of North Carolina.

The M.A. program in Latin American Studies has the following educational objectives:

- to study the culture, geography, history, politics, and society of Latin America and the Spanish-speaking Caribbean
- to provide an understanding of the socio-cultural background of the Latino population in the United States
- to understand economic development and underdevelopment from a comparative perspective
- to undertake interdisciplinary research in the humanities and social sciences using a variety of methodologies
- to instill writing and critical thinking skills by teaching rigorous scholarly inquiry and research methods at a level appropriate for graduate education
- to develop language competencies in Spanish and/or Portuguese

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, an undergraduate degree, preferably in Latin American Studies or in a related field such as Anthropology, Architecture, Art, Geography, History, International Business, International Studies, Political Science, Portuguese, Sociology, or Spanish, with a GPA of at least 3.0 is required. However, the admissions committee will consider applicants with an average lower than this minimum if the other elements of the application are strong.

Spanish proficiency at the advanced level as demonstrated by undergraduate course work, an oral interview, a standardized test, and/or life experience is also required. Knowledge of Portuguese is desirable but not required.

A combined score of at least 1000 on the verbal and math portions of the GRE is required. Again, the admissions committee will consider applicants with a lower score than this minimum if the other elements of the application are strong.

The following documents must be submitted for admission:

- a) UNC Charlotte Graduate School online application form.
- b) Official academic transcripts.
- c) Official GRE score.
- d) Statement of purpose.
- e) Evidence of proficiency in Spanish.
- f) Three letters of recommendation on the UNC Charlotte recommendation form.
- g) International students only: evidence of proficiency in English as well as the following UNC Charlotte forms: immigration status, statement of financial responsibility, and estimated expenses.

Degree Requirements

The Master of Arts degree in Latin American Studies requires completion, with a GPA of 3.0 or better, of at least 30 hours in approved graduate courses. These courses must include at least 18 credit hours which are only open to graduate students. No more than twelve semester hours may be taken for credit in the degree program at the 5000 level.

Students must maintain a 3.0 average in all LTAM graduate courses to remain in the program. As per the academic regulations of the UNC Charlotte Graduate School, one U or more than two grades of C in graduate coursework will lead to suspension in enrollment.

At the end of the program, students will display Spanish proficiency at the advanced level in speaking, reading, and writing.

Most students will complete the program in two to three years. University policy requires that no course listed on a master's student's candidacy form be older than six years at the time of graduation. Courses that exceed this time limit must be revalidated or retaken, whichever the graduate program decides necessary, if they are to count in a degree program.

Transfer Credit

A maximum of 6 hours of graduate transfer credit will be accepted.

Admission to Candidacy Requirements

An Admission to Candidacy form must be submitted during the semester preceding the one in which the student plans to complete the degree requirements, either by defending a thesis or taking a comprehensive examination.

Curriculum

Students will choose one of two tracks within the degree program: a thesis track and an examination track. The thesis track prepares students for graduate work at the doctoral level in Latin American Studies or one of its constituent disciplines, while the examination track prepares students for employment in the private and public sectors.

I. Thesis track (30 hours)

- 1) Interdisciplinary core (12 hours)
 - a) Two sections of LTAM 5600 Seminar in Latin American Studies (6 hours).
 - b) LTAM 6910 Thesis Tutorial (3 hours).
 - c) LTAM 6920 Master's Thesis (3 hours). As part of this course, students will prepare and defend a thesis before a committee composed of three faculty members from at least two different disciplines. A satisfactory grade (A or B) on the thesis is required for graduation.
- 2) Multidisciplinary work (18 hours)

- a) Social Sciences: LTAM 6100 and one other course in the social sciences (6 hours)
- b) History: Two courses in Latin American history (6 hours)
- c) Humanities: LTAM 6300 and one other humanities course (6 hours)

Note: Up to two of these courses may be independent studies (LTAM 6800 and/or 6801)

II. Examination track (30 hours)

- 1) Interdisciplinary core (9 hours)
 - a) Two sections of LTAM 5600 Seminar in Latin American Studies (6 hours) **Or** one section of LTAM 5600 and 3 hours of LTAM 6400 Internship.
 - b) LTAM 6950 Comprehensive Examination (3 hours). Based on an interdisciplinary reading list of at least 40 titles, students will take a written and oral comprehensive examination before a committee composed of three faculty members from at least two different disciplines. A satisfactory grade (A or B) on the written examination is required to proceed to the oral examination; in case of an unsatisfactory grade, the written examination may be retaken once. Similarly, a satisfactory grade of A or B on the oral examination is required for graduation, and the student may retake the oral examination once in case of an unsatisfactory grade.
- 2) Multidisciplinary work (21 hours)
 - a) Social Sciences: LTAM 6100 and one other course in the social sciences (6 hours)
 - b) History: Two courses in Latin American history (6 hours)
 - c) Humanities: LTAM 6300 and one other humanities course (6 hours)
 - d) One other course taken in any of the categories above.

Note: Up to two of these courses may be independent studies (LTAM 6800 and/or 6801)

COURSES IN LATIN AMERICAN STUDIES

LTAM 5000. Graduate Topics in Latin American Studies. (3) Intensive treatment of a topic in Latin American Studies, depending on student needs and staff resources. May be repeated for credit as topics vary. (*On demand*)

LTAM 5116. Culture and Conflict in the Amazon. (3) Cross-listed as ANTH 4616. This course examines Brazilian development strategies in the Amazon and explores how these policies have affected both the environment and the various populations living in the Amazon. Topics covered include environmental degradation, human rights

abuses, culture change, migration, and globalization. (*On demand*)

LTAM 5120. Advanced Business Spanish I. (3) Cross-listed as SPAN 5120. Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Advanced studies in Business Spanish, intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as economics, management, and marketing. (*Fall*)

LTAM 5121. Advanced Business Spanish II. (3) Cross-listed as SPAN 5121. Prerequisites: Post-baccalaureate status, B.A. in Spanish, courses or permission of the Department. Advanced studies in Business Spanish, intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as marketing, finance, and import-export. (*Spring*)

LTAM 5310. Studies in Spanish American Poetry. (3) Cross-listed as SPAN 5210. Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Studies of 19th and 20th century Spanish American poetry. (*On demand*)

LTAM 5311. Studies in Spanish American Prose Fiction. (3) Cross-listed as SPAN 5211. Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Studies of 19th and 20th century Spanish American prose fiction. (*On demand*)

LTAM 5312. Studies in Spanish American Theater. (3) Cross-listed as SPAN 5212. Prerequisites: Permission of the Department. Studies of 20th century Spanish American theater. (*On demand*)

LTAM 5600. Seminar in Latin American Studies. (3) Cross-listed as LTAM 4600. A seminar involving in-depth research and analysis of a topic suitable for interdisciplinary study and exploration of a variety of methodological approaches. May be repeated for credit as topics vary (*Fall, Spring*)

LTAM 6000. Advanced Graduate Topics in Latin American Studies. (3) Intensive treatment of a topic in Latin American Studies, depending on student needs and staff resources. May be repeated for credit as topics vary.

LTAM 6100. Seminar in Latin American Politics. (3) An analysis of contemporary Latin American politics (*Alternate Years*)

LTAM 6250. Comparative Slavery and Race Relations. (3) Cross-listed as HIST 6250. Prerequisite: permission of the department. Slavery in the New World through its abolition including Indian and African slaves, the slave trade, the economics of slavery, and the impact of slavery on modern race relations in the Americas. (*Alternate years*)

LTAM 6251. Seminar in Colonial Latin American History (3) Cross-listed as HIST 6151. Prerequisite: permission of the department. A seminar devoted to selected themes in colonial Latin American history. This course provides an introduction to research methods, documentary sources, and the critical analysis of historical literature. Topics will change. Course may be repeated for credit. (*Alternate years*)

LTAM 6252. Seminar in Modern Latin American History (3) Cross-listed as HIST 6152. Prerequisite: permission of the department. A seminar devoted to selected themes in modern Latin American history. This course provides an introduction to research methods, documentary sources, and the critical analysis of historical literature. Topics will change. Course may be repeated for credit. (*Alternate years*)

LTAM 6300. Seminar in Latin American Thought. (3) An examination of Latin American thought from the Spanish Conquest to the present day. Emphasis on colonialism and postcolonialism as well as ethnic, racial, class, national, and gender identity (*Alternate years*)

LTAM 6307. Advanced Studies in Spanish American Literature. (3) Cross-listed as SPAN 6007. Prerequisite: permission of the Department. Study of selected works, writers, literary genres, periods, and schools from Spanish America. May be repeated for credit as topics vary. (*On demand*)

LTAM 6350. Histories of Latin American Architecture. (3) Cross-listed as ARCH 6050. This course will survey the ways by which Latin American architectures (both north and south of the US/Mexico border) have come to be seen within the western canon. In this sense, this course is not purely historical; rather, the class will explore Latin American architectures chronologically but from a post-colonial perspective rooted in the present (*Alternate years*)

LTAM 6400. Internship. (1-3) Prerequisite: Permission of the Department. Supervised work experience in Latin America or related to Latino/a and Latin American Studies issues in the Charlotte area, accompanied by a written project.

LTAM 6800. Directed Readings. (3) Prerequisite: prior written permission of instructor and Director of Latin American Studies. Coverage of topics through individually designed reading programs and scheduled conferences with a faculty member. May be repeated for credit.

LTAM 6801. Directed Research. (3) Prerequisite: prior written permission of instructor and Director of Latin American Studies. Investigation of a topic in Latin American Studies culminating in a research paper.

LTAM 6910. Thesis Tutorial. (3) Independent study with a faculty advisor chosen by the student to conduct research for the M.A. thesis.

LTAM 6920. Master's Thesis. (3) Preparation of the master's thesis under the supervision of the thesis committee.

LTAM 6950. Comprehensive Examination (3) Preparation for and completion of the comprehensive exam option of the M.A. in Latin American Studies based on a reading list compiled in consultation with three examiners from at least two different departments.

Liberal Studies

- **M.A. in Liberal Studies**

Liberal Studies Program

www.lbst.uncc.edu

Director

Dr. Paula Eckard

Graduate Faculty

Faculty are drawn from a wide array of disciplines across the university.

MASTER OF ARTS IN LIBERAL STUDIES

The Master of Arts degree program in Liberal Studies (MALS) is designed primarily for adults seeking to enhance their general education in the liberal arts at the graduate level. It provides a flexible, multidisciplinary framework to accommodate the varied undergraduate backgrounds and personal interests that students bring to the program. The curriculum draws upon the full range of the humanities, social sciences, and natural sciences. The emphasis is on liberal arts education rather than on specialized study or professional training.

For recent recipients of the baccalaureate degree, the Liberal Studies program may provide the insight needed to make an informed career choice, or it may enhance opportunities in a career already launched. For returning students, graduate liberal studies may renew ties with university life or lead to a change of career. For persons with significant work experience, the program offers a chance to integrate the life of the mind with that of the workplace. Just as students come to the Liberal Studies program from a variety of fields, so they pursue a variety of careers after graduation. The most widely represented are in business, education, government, law, and social services.

Although the Liberal Studies program is not exclusively an evening program, the majority of courses are offered at

times convenient for working adults. It is possible to earn the degree in a timely fashion through evening courses only.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Liberal Studies:

- 1) A GPA of at least 2.75 on academic work beyond high school and 3.0 for courses prerequisite to the area of proposed graduate study.
- 2) Satisfactory scores on the Miller Analogies Test or the Verbal and Analytical portions of the Graduate Record Examination.
- 3) A two-page essay describing the applicant's objectives in undertaking graduate work in Liberal Studies.
- 4) A resume of employment history or volunteer experience (for applicants who have been out of school for at least five years or whose baccalaureate degree was delayed).
- 5) Acceptance into the program is contingent on an interview with members of the Liberal Studies Faculty Advisory Committee.

Degree Requirements

The master's program in Liberal Studies requires a minimum of 30 semester hours of graduate work, including at least 15 semester hours in courses open only to graduate students. A student must have a cumulative average of 3.0 in courses in their degree plan of study in order to graduate. Please consult the Graduate School's grading policies under "Degree Requirements and Academic Regulations."

The program begins with two core courses that give students some common grounding in the issues of liberal arts education. Each student then chooses a program emphasis by completing at least four courses that focus on a common theme. Degree requirements also include a Liberal Studies elective course and two elective courses that can be taken in any department in the College of Liberal Arts and Sciences. The requirements are outlined below:

Core Courses

- MALS 6101 The Liberal Arts Tradition (3)
- MALS 6102 Ideas Across the Disciplines (3)

Program Emphasis

Four related courses focusing on a theme developed by the student and faculty advisor (12 hours).

Liberal Studies Elective (3 hours)

General Electives (6 hours)

Concluding Seminar

- MALS 6600 Liberal Studies Seminar (3)

No more than 6 hours of independent study may be applied to the degree. Students requesting independent study must have successfully completed at least 12 semester hours in the

program, including MALS 6101 and 6102. A form for such requests is available in the Director's office and must be completed and the study approved in advance of registration.

COURSES IN LIBERAL STUDIES

MALS 6000. Topics in Liberal Studies. (3) Selected topics approached from interdisciplinary perspectives in the liberal arts. May be repeated for credit as topics change. Examples include interrelated courses forming program emphases on Language and Culture and on Religious Ideas in Physical Forms. (*Fall, Spring*)

MALS 6101. The Liberal Arts Tradition. (3) The concept of a liberal education and its relationship to human understanding as reflected in representative historical traditions, literature, art, and intellectual works. Examination of selected classics of the Western tradition and critiques through the use of works from other traditions and perspectives. (*Fall, Spring*)

MALS 6102. Ideas Across the Disciplines. (3) Enduring ideas and their impact on history, society and culture. Each semester a single idea is examined through a variety of writings spanning the liberal arts disciplines. Examples include the idea of nature, the idea of human nature, the idea of the democracy and the idea of citizen. May be repeated with permission of the Director of MALS. (*Fall, Spring*)

MALS 6600. Liberal Studies Seminar. (3) An integration of the course work previously taken by each of the seminar members and the completion of a final essay, project, or comprehensive exam. (*Yearly*)

MALS 6890. Directed Reading/Research. (1-3)

Prerequisite: Prior written permission of instructor and MALS Director. Graduate students will meet individually or in small groups with the instructor and will be assigned readings and/or research on an interdisciplinary theme. Attendance at the lectures is a course requirement. (*Fall, Spring, Summer*)

MALS 7999. Master's Degree Graduate Residency Credit.

(1) Meets Graduate School requirement for continuous enrollment. (*Fall, Spring*)

Mathematics

- **Ph.D. in Applied Mathematics**
- **M.S. in Mathematics**
- **M.S. in Mathematics Education**
- **Ph.D. in Curriculum and Instruction: Mathematics Education Specialization**
(see *College of Education section of this Catalog for details*)
- **M.S. in Mathematical Finance**
(see *Inter-College Graduate Programs section of this Catalog for details*)

Department of Mathematics

376 Fretwell
704-687-2580
www.math.uncc.edu/index.php/graduate.html

Coordinators

Dr. Joel Avrin (for Mathematics)
Dr. Victor Cifarelli (for Mathematics Education)

Graduate Faculty

Robert Anderson, Associate Professor
Joel Avrin, Professor
Jaya Bishwal, Assistant Professor
Animikh Biswas, Associate Professor
Charles Burnap, Associate Professor
Wei Cai, Professor
Zongwu Cai, Professor
Jeong-Lim Chae, Assistant Professor
Victor V. Cifarelli, Associate Professor
Ming Dai, Assistant Professor
Xingde Dai, Professor
Shaozhong Deng, Assistant Professor
Yuanan Diao, Professor
Jacek Dmochowski, Associate Professor
Alan Dow, Professor
Anthony Fernandes, Assistant Professor
Yuri Godin, Assistant Professor
Alexander Gordon, Assistant Professor
Pavel Grigoriev, Assistant Professor
Mary Kim Harris, Associate Professor
Gabor Heteyi, Associate Professor
Evan G. Houston, Professor
Jiancheng Jiang, Assistant Professor
Mohammad A. Kazemi, Professor
Michael V. Klibanov, Professor
Thomas G. Lucas, Professor
Thomas R. Lucas, Professor
Stanislav Molchanov, Professor
Hae-Soo Oh, Professor
Joseph E. Quinn, Professor
Franz Rothe, Associate Professor
David C. Royster, Associate Professor
Adalira Sáenz-Ludlow, Associate Professor

Oleg Safronov, Assistant Professor
Douglas S. Shafer, Professor
Isaac M. Sonin, Professor
Alexandros Sopasakis, Assistant Professor
Nicholas M. Stavrakas, Professor
Yanqing Sun, Professor
Boris R. Vainberg, Professor
Barnet Weinstock, Professor
Volker Wihstutz, Professor
Mingxin Xu, Assistant Professor
Zhi Yi Zhang, Associate Professor
Weihua Zhou, Assistant Professor
You-Lan Zhu, Professor

PH.D. IN APPLIED MATHEMATICS

The Ph.D. degree program in Applied Mathematics is designed to enable its students to master a significant body of mathematics, including a specialty in applied mathematics; to relate this knowledge to a coherent area of science or engineering; and to carry on fundamental research in applied mathematics at a nationally competitive level. Recipients of this degree will, according to their abilities and choice of sub-specialty, be able to work effectively in a research and development environment involving mathematical or statistical analysis and modeling in business, government or industry; to teach mathematics at the college or university level; or to carry on fundamental research in their area of specialty.

Additional Admission Requirements

In addition to the requirements of the Graduate School for admission to doctoral study, applicants must have completed at least 27 hours of courses in the mathematical sciences at the undergraduate level, as approved by the department Graduate Committee, with grades of C or better. Admission requires that the candidate be able to take MATH 8143 or be able to take MATH 5143 and have other factors in their record that indicates strong potential to complete the program. For prospective students who have done work in mathematics beyond the bachelor's degree, performance on that work will be considered in admissions decisions. Candidates for admission must make satisfactory scores on the general portion of the Graduate Record Examination (GRE).

Students are admitted to the program by the Graduate School, based on the recommendation of the department Graduate Committee or its designate, the Graduate Coordinator. Recommendations are based on the Committee's judgment of the candidate's ability to complete the program, as supported by the application materials. The department may waive certain requirements if it judges the candidate to be nonetheless capable of completing the program. If there are more candidates than can be accommodated, candidates are admitted in order of perceived mathematical ability, promise of success, and suitability to the program.

Program of Study

The student must complete an approved program of study, including a minor, typically including approximately 54 credit hours. The minor is interdisciplinary and may be satisfied by 9 hours of graduate work outside the mathematics department, by 6 credit hours for a directed project in an area of application, or by a combination of external coursework and directed project in an area of application totaling 9 credit hours.

Each student will have an advisory committee appointed by the department Graduate Committee in consultation with the student and approved by the Department Chair. It includes the prospective dissertation advisor, as well as a department co-advisor, if the dissertation advisor is not a member of the Department of Mathematics and Statistics. The advisory committee should be appointed as soon as is feasible, usually within a year after passing the Preliminary Examination. Once formed, it will have the responsibility of constructing and approving the program of study which includes the minor. Prior to the appointment of the advisory committee the student will be advised by a graduate faculty member appointed by the department Graduate Committee.

Grades

A student is expected to achieve A's or B's in all courses included in the program of study and must have at least a 3.0 GPA to graduate. The dissertation is graded on a pass/unsatisfactory basis and, therefore, will not be included in the cumulative average. An accumulation of more than two marginal (C) grades will result in suspension of the student's enrollment in the program. If a student makes a grade of U on any course, enrollment will be suspended and the student cannot take further graduate work without being readmitted to the program. Readmission to the program requires approval of the Dean of the Graduate School upon the recommendation of the department Graduate Committee.

Transfer Credit

Only courses with grades of A or B may be accepted for transfer credit. Transfer credit must be recommended by the department Graduate Committee and approved by the Dean of the Graduate School. The amount of transfer credit cannot exceed the limit set by the Graduate School.

Preliminary Examination

The student is expected to take the preliminary examination within three semesters of being admitted to the Ph.D. program. The examination consists of two parts: a written examination based on Real Analysis I and II (8143-8144) and a written examination based on two other related courses chosen by the student and approved by the department Graduate Committee. At the discretion of the department Graduate Committee, the student may be allowed to retake a portion of the preliminary examination a second time if the student does not pass that portion on the first attempt. A student who does not complete the

preliminary examination after two attempts is terminated from the Ph.D. program.

Qualifying Examination and Admission to Candidacy

Each student must pass a comprehensive oral examination covering her/his chosen field of research and related advanced course work. The exam is conducted by the student's Advisory Committee and may include an additional written examination. The exam is open to the graduate faculty of the department. The student is expected to take the qualifying examination within two years of the appointment of the student's Advisory Committee. A student who fails the qualifying examination twice is terminated from the Ph.D. program. The dissertation topic may be proposed after the student has passed the qualifying examination. A doctoral student advances to candidacy after the dissertation topic has been approved by the student's advisory committee and the Dean of the Graduate School.

Assistantships

A number of graduate assistantships are available each year (with nationally-competitive stipends) for qualified applicants. A limited number of fellowship awards can be applied to supplement these stipends or provide stand-alone stipends up to \$25,000 for especially qualified students.

Dissertation

The student must complete and defend a dissertation based on a research program approved by the student's dissertation advisor which results in a high quality, original and substantial piece of research. The student must orally present and successfully defend the dissertation before the student's Advisory Committee in a defense that is open to the public. A copy of the dissertation must be made available to the graduate faculty of the department at least two weeks prior to the public defense. The dissertation will be graded on a pass/unsatisfactory basis by the Advisory Committee and must be approved by the Department Graduate Coordinator and the Dean of the Graduate School.

Residency Requirement

The full-time Ph.D. student must enroll for one continuous full-time year (i.e., two consecutive semesters of at least nine graduate credit hours in each semester) following admission to the program.

Language and Research Tool Requirements

Each student must demonstrate a reading knowledge of French, German or Russian by passing a written translation exam in one of these languages conducted by the Mathematics Department. In addition, the student must demonstrate significant computer expertise applicable to research or teaching in his or her major field as approved by the student's Advisory Committee. The computer expertise requirement may include course work or work on a project and may overlap with the minor requirement.

Time Limit for Degree Completion

The student must achieve admission to candidacy within six years after admission to the program and complete all requirements within six years after admission to candidacy for the Ph.D. degree. All requirements for the degree must be completed within eight years after first registration as a doctoral student.

MASTER OF SCIENCE IN MATHEMATICS

The Master of Science Degree in Mathematics is organized into three concentrations: the concentration in General Mathematics, the concentration in Applied Mathematics, and the concentration in Applied Statistics. The concentration in General Mathematics is a robust but flexible program that allows a student to develop a broad background in Mathematics ranging over a variety of courses chosen from both pure and applied areas, or to tailor a program toward a particular focus that may not be as closely covered by our other degree concentrations (e.g., one that is interdisciplinary in nature). The concentration in Applied Mathematics develops analytical and computational skills focused toward applications of mathematics in the physical sciences as encountered in industry, government, and academia. The concentration in Applied Statistics provides theoretical understanding of, and training in, statistical methods applicable to particular areas of business, industry, government, and academia.

All candidates, regardless of which concentration is chosen, are required to take MATH 5143-5144 or STAT 5126-5127; MATH 7691 (or in the case of the General Mathematics concentration, a suitable/approved 7000 level course); and a comprehensive exam. Students may also choose a thesis option for 3-6 credit hours towards the required semester hour total.

Concentration In General Mathematics

The Master of Science degree concentration in General Mathematics is designed both to provide advanced skills and knowledge for persons seeking positions in industry, government, or teaching at the community college level, and to provide professional development to persons currently in such positions. Graduates are also prepared to enter directly into at least the second year of a Ph.D. program in mathematics, applied mathematics or statistics, depending on the particular course of study.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for the concentration in General Mathematics:

- 1) Applicants must present evidence of the satisfactory completion of at least 27 semester hours of

mathematics approved by the department Graduate Committee.

- 2) A satisfactory score is required on at least the Quantitative portion of the Graduate Record Examination.
- 3) It is recommended that the student have a basic knowledge of at least two of the areas of algebra, real analysis and topology.

Concentration Requirements

The Master of Science degree concentration in General Mathematics requires successful completion of at least 30 semester hours of graduate work approved by the department Graduate Committee including: MATH 5143 and 5144 or their equivalents, at least one course each from two of the groups I, II, III, and V below, and at least 15 hours in 7000-level courses. No credit shall be given for 6000-level math courses other than math finance courses. With the approval of the department Graduate Committee, one 3-hour 6000-level course in another department of a theoretical nature may be applied toward the 15 hours. Candidates for the degree concentration must demonstrate, to the satisfaction of the department Graduate Committee, competence on general knowledge in at least three of five groupings of courses listed below. This may be accomplished by (a) successful performance on a written comprehensive examination or (b) successful completion of courses in these areas.

Group I Applied Mathematics

- OPRS 5111 Linear Programming (3)
- OPRS 5112 Non-Linear Programming (3)
- OPRS 5113 Game Theory (3)
- OPRS 5114 Dynamic Programming (3)
- MATH 5165 Numerical Linear Algebra (3)
- MATH 5172 The Finite Element Method (3)
- MATH 5173 Ordinary Differential Equations (3)
- MATH 5174 Partial Differential Equations (3)
- MATH 5176 Numerical Methods for Partial Diff Equations (3)
- MATH 7172 Partial Differential Equations (3)
- MATH 7176 Advanced Numerical Analysis (3)
- MATH 7177 Applied Optimal Control (3)
- MATH 7178 Comp. Methods for Fluid Dynamics (3)
- MATH 7273 Advanced Finite Element Analysis (3)

Group II Probability-Statistics

- STAT 5123 Applied Statistics I (3)
- STAT 5124 Applied Statistics II (3)
- STAT 5126 Theory of Statistics I (3)
- STAT 5127 Theory of Statistics II (3)
- STAT 7027 Topics in Statistics (3)
- STAT 7122 Advanced Statistics I (3)
- STAT 7123 Advanced Statistics II (3)
- STAT 7127 Linear Statistical Models (3)
- STAT 7133 Multivariate Analysis (3)
- MATH 5128 Applied Probability I (3)
- MATH 5129 Applied Probability II (3)
- MATH 7120 Probability Theory I (3)
- MATH 7121 Probability Theory II (3)

MATH 7125 Stochastic Processes (3)

Group III Algebra-Topology

MATH 5163 Modern Algebra (3)
 MATH 5164 Abstract Linear Algebra (3)
 MATH 5181 Introduction to Topology (3)
 MATH 7163 Modern Algebra I (3)
 MATH 7164 Modern Algebra II (3)

Group IV Analysis

MATH 5143 Analysis I (3)
 MATH 5144 Analysis II (3)
 MATH 7141 Complex Analysis I (3)
 MATH 7143 Real Analysis I (3)
 MATH 7144 Real Analysis II (3)

Group V Computer Science

All 5000- and 6000-level Computer Science courses

Assistantships

A number of graduate assistantships are available each year (with nationally-competitive stipends) for qualified applicants. A limited number of fellowship awards can be applied to supplement these stipends for especially qualified students.

Thesis

Completion of a thesis is optional. With the approval of the department Graduate Committee, a candidate may receive up to six of the 15 hours required at the 7000 level for the writing of a master's thesis on an approved topic. This thesis may be original work, work of an expository nature, or the mathematical formulation and solution of a particular industrial or business problem suggested by the career interests of the student. A candidate may receive no more than six of the hours required at the 7000 level for course and thesis work in another department. If the thesis option is elected, the candidate will be required to defend his/her thesis in an oral examination.

Comprehensive Examination

A candidate must perform satisfactorily on an oral comprehensive examination over his/her program of study.

Concentration In Applied Mathematics

The Master of Science degree concentration in Applied Mathematics is designed to develop critical thinking, intuition, and advanced experience in the techniques of mathematical analysis and their application to the problems of industry and technology. Skills are developed to deal with problems encountered in industry, business, and governmental work; to hold leadership positions in industry or government work; to teach Applied Mathematics at the undergraduate or community college level; and to study Applied Mathematics leading to the Ph.D. degree.

Concentration Requirements

A candidate for the Master of Science degree concentration in Applied Mathematics must complete at least 30 semester hours of graduate work approved by the department Graduate Committee to include:

Core Requirements (21 semester hours)

MATH 5143 Analysis I (3)
 MATH 5144 Analysis II (3)
 MATH 5165 Numerical Linear Algebra (3)

One elective in Numerical Analysis selected from:
 MATH 5172 The Finite Element Method (3)
 MATH 5176 Numerical Methods for Partial Differential Equations (3)

One elective in Advanced Analysis selected from:
 MATH 7141 Complex Analysis I (3)
 MATH 7143 Real Analysis I (3)
 MATH 7144 Real Analysis II (3)

Two electives in Advanced Applied Mathematics selected from:
 MATH 7172 Partial Differential Equations (3)
 MATH 7176 Advanced Numerical Analysis (3)
 MATH 7177 Applied Optimal Control (3)
 MATH 7178 Computational Methods for Fluid Dynamics (3)
 MATH 7273 Adv. Finite Element Analysis. (3)

Electives (6 semester hours)

One advanced elective from:
 MATH 7141 Complex Analysis I (3)
 MATH 7143 Real Analysis I (3)
 MATH 7144 Real Analysis II (3)
 MATH 7172 Partial Differential Equations (3)
 MATH 7176 Advanced Numerical Analysis (3)
 MATH 7177 Applied Optimal Control (3)
 MATH 7178 Computational Methods for Fluid Dynamics (3)
 MATH 7273 Adv. Finite Element Analysis (3)
 MATH 7893 Thesis (0-3)

One elective in Mathematics or a suitable area of application to be selected with the approval of the student's advisor. Suggested electives include:
 OPRS 5113 Game Theory (3)
 STAT 5123 Applied Statistics I (3)
 MEGR 6116 Fundamentals of Heat Transfer and Fluid Flow (3)
 MEGR 6141 Theory of Elasticity I (3)
 MEGR 7112 Radiative Heat Transfer (3)
 MEGR 7114 Advanced Fluid Mechanics (3)

Research Seminar (3 hours)

All candidates for the degree concentration must complete three hours of MATH 7691 (Research Seminar) in which they carry out an independent project under the supervision of a member of the graduate faculty. The project could involve a specific application to a concrete problem of

techniques identified in the literature or studied in other courses. All projects are subject to prior approval of the department Graduate Committee and must be successfully defended before a committee of three graduate faculty members appointed by the department Graduate Committee.

Assistantships

A number of graduate assistantships are available each year (with nationally-competitive stipends) for qualified applicants. A limited number of fellowship awards can be applied to supplement these stipends for especially qualified students.

Thesis

A student may choose to expand the work begun in MATH 7691 into a master's thesis by registering for three hours of MATH 7893 to fulfill the advanced elective requirement (1) described above. This thesis option affords the student the opportunity to do professional/scholarly work demonstrating proficiency in the area of Applied Mathematics.

Comprehensive Examination

Each candidate for the degree concentration in Applied Mathematics must perform satisfactorily on a final comprehensive examination. This examination will be set and administered by a committee appointed by the department Graduate Committee. It may be either in written or oral form, and it will cover those areas of study and/or research deemed appropriate by the committee.

Concentration In Applied Statistics

The Master of Science degree concentration in Applied Statistics is designed to provide advanced skills and knowledge in the planning, design, testing, and implementation of statistical methods. Skills are developed to deal with problems encountered in statistical applications in business, industry and government; to hold administrative positions requiring planning and implementation of statistical analysis; to teach statistics at the undergraduate or community college level; and to study statistics leading to the Ph.D. degree.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for the concentration in Applied Statistics:

- 1) An overall GPA of at least 3.0 on all previous college work including a GPA of at least 3.0 in courses prerequisite to the area of applied statistics.
- 2) Evidence of undergraduate preparation in mathematics and computer science including: 12 semester hours of calculus at the level of MATH 1241/1242/2241/2242; 3 semester hours of linear algebra at the level of MATH 2164; 3 semester hours of differential equations at the level of MATH 2171; 6 semester hours of probability

and statistics at the level of MATH 3122/3123; and 3 semester hours of computer programming at the level of ITCS 1214.

Degree Requirements

A candidate for the Master of Science degree concentration in Applied Statistics must complete a minimum of 33 semester hours of graduate work approved by the department Graduate Committee including:

Core Requirements (24 semester hours)

STAT 5123 Applied Statistics I (3)
 STAT 5124 Applied Statistics II (3)
 STAT 5126 Theory of Statistics I (3)
 STAT 5127 Theory of Statistics II (3)
 STAT 7027 Topics in Statistics (3)
 STAT 7127 Linear Statistical Models (3)
 STAT 7133 Multivariate Analysis (3)
 MATH 7691 Research Seminar (1-3)

Electives (9 semester hours)

Two courses selected from an approved list of MATH/STAT or applied courses. Examples include:

STAT 7027 Topics in Statistics (3)
 MATH 5128 Applied Probability I (3)
 MATH 5129 Applied Probability II (3)
 MATH 5143 Analysis I (3)
 MATH 5165 Numerical Linear Algebra (3)
 MATH 7120 Probability Theory I (3)
 MATH 7121 Probability Theory II (3)
 MATH 7143 Real Analysis I (3)
 MATH 7692 Research Seminar (3)
 OPRS 5111 Linear Programming (3)
 OPRS 5112 Non-linear Programming (3)
 OPRS 5113 Game Theory (3)
 OPRS 5114 Dynamic Programming (3)

AND

Any MATH/STAT/OPRS course at the 7000 level

Students who, because of their undergraduate work or other experience, can demonstrate sufficient knowledge of the material in one or more of the core courses may be exempted from taking the course or courses. Exemption from a course carries no credit towards the degree concentration.

Research Seminar and Thesis Option (3 semester hours)

All candidates for the Master of Science degree concentration in Applied Statistics are required to complete 3 hours of MATH 7691 (Research Seminar) in which they carry out an independent project under the supervision of a member of the graduate faculty. The project could involve a specific application of techniques identified in the literature or studied in other courses. All projects are subject to the prior approval of the department Graduate Committee and must be successfully defended before a committee of three graduate faculty members appointed by the department Graduate Committee.

A student may choose to expand the work begun in MATH 7691 (Research Seminar) into a Master's Thesis by registering for 3 hours of MATH 7893 (Thesis) to fulfill the elective requirement under (2) above. This thesis option affords the student the opportunity to do professional and scholarly work demonstrating proficiency in the area of applied statistics.

Assistantships

A number of graduate assistantships are available each year (with nationally-competitive stipends) for qualified applicants. A limited number of fellowship awards can be applied to supplement these stipends for especially qualified students.

Comprehensive Examination

Each candidate for the Master of Science degree concentration in Applied Statistics must perform satisfactorily on an oral comprehensive examination over the candidate's program of study.

MASTER OF ARTS IN MATHEMATICS EDUCATION

The Master of Arts in Mathematics Education degree program is designed primarily for secondary mathematics school teachers interested in professional growth and graduate certification in mathematics teaching. Emphasis in this program is given to developing depth and breadth in mathematics teaching and learning, appropriate to the role of the secondary school teacher.

By the end of his/her first semester in the program, each student will select a member of the Mathematics Education faculty who will serve as his/her Graduate Advisor throughout the program. Approval of the program of each student and provision of advice regarding progress toward the degree are the responsibility of the Graduate Advisor.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for graduate study in Mathematics Education:

- 1) Twenty-seven hours of undergraduate coursework in Mathematics beyond the freshman level, or evidence of equivalent academic preparation.
- 2) Possession of a North Carolina "A" teacher's license or the equivalent from another state. An applicant may be admitted on the condition that he/she satisfies the Class "A" requirements early in his/her course of study. Work applied to the Class "A" deficiency may not be applied toward the degree.
- 3) Two years of full-time experience teaching mathematics in a secondary school or other acceptable teaching experience.
- 4) A satisfactory score is required on the Aptitude Portion of the Graduate Record Examination.

Degree Requirements

The Master of Arts in Mathematics Education degree requires successful completion of a minimum of 36 semester hours of graduate credit or the equivalent. Of these, 18 hours must be in courses numbered 6000 or above. Programs of study beyond these 36 hours may be required to remove deficiencies in undergraduate programs or to develop areas of need, interest, or desired experience.

Core Courses

Each candidate must complete:

- 1) 18 hours of graduate-level Mathematics courses selected in consultation with the program Coordinator, with at least 9 hours of courses at the 6000-level. A recommended plan of study includes:
MATH 6100 Foundations of Mathematics (3)
MATH 6101 Foundations of Real Analysis (3)
MATH 6102 Calculus from an Advanced Viewpoint (3)
MATH 6106 Modern Algebra (3)
MATH 6107 Linear Algebra (3)
MATH 6118 Non-Euclidean Geometry (3)
- 2) 12 hours of graduate-level courses covering mathematics education learning theory, research, and contemporary topics in secondary mathematics teaching. These courses include:
MAED 6122 Theoretical Foundations of Learning Mathematics (3)
MAED 6123 Research in Mathematics Education (3)
MAED 6124 Issues in the Teaching of Secondary School Mathematics (3)
RSCH 6101 Educational Research Methods (3)
- 3) 3 hours of graduate-level professional education courses including:
MDSK 6260 Principles of Teacher Leadership (3)
- 4) An additional three hours of graduate-level Mathematics, Mathematics Education, or Education courses selected in consultation with the student's advisor.
- 5) A Basic Portfolio consisting of documents and artifacts that provides evidence of the student's professional growth during the program.

Comprehensive Exam

Upon successful completion of all coursework, each candidate for the degree in Mathematics Education must pass a comprehensive final exam consisting of two parts. The student must pass an oral exam on the mathematics content courses. The second part of the exam involves the student presenting documentation that demonstrates their professional growth as teachers and educational researchers. The student has the option of presenting either a research-based project or a comprehensive portfolio. The Graduate Advisor will advise and assist the student in planning his/her Comprehensive Portfolio or Final Research Report.

PH.D. IN CURRICULUM AND INSTRUCTION: MATHEMATICS EDUCATION SPECIALIZATION

In addition to the Master of Arts in Mathematics Education program, the department offers a Mathematics Education specialization to students enrolled in the Ph.D. program in Curriculum and Instruction in the College of Education. For details, please see the Curriculum and Instruction degree information located in the College of Education section of this *Catalog*.

COURSES IN MATHEMATICS, MATHEMATICS EDUCATION, AND STATISTICS

Mathematics

MATH 5000. Topics in Foundations or History of Mathematics. (2-3) Prerequisite: permission of the department. Topics in the foundations or the history of mathematics selected to supplement regular course offerings in this area of mathematics. May be repeated for credit with approval of the department. Credit for the M.A. degree in mathematics requires approval of the department. (*On demand*)

MATH 5040. Topics in Analysis. (2-3) Prerequisite: permission of the department. Topics in the foundations or the history of mathematics selected to supplement regular course offerings in this area of mathematics. May be repeated for credit with the approval of the department. Credit for the M.A. degree in mathematics requires approval of the department. (*On demand*)

MATH 5060. Topics in Algebra. (2-3) Prerequisite: permission of the department. Topics in algebra selected to supplement regular course offerings in this area of mathematics. May be repeated for credit with the approval of the department. Credit for the M.A. degree in mathematics requires approval of the department. (*On demand*)

MATH 5080. Topics in Geometry and Topology. (3) Prerequisite: permission of the department. Topics in geometry or topology selected as to supplement regular course offerings in this area of mathematics. May be repeated for credit with approval of the department. Credit for M.A. degree in mathematics requires approval of the department. (*On demand*)

MATH 5109. History of Mathematical Thought. (3) Prerequisite: MATH 1241 or permission of the department. A study of the development of mathematics in its historical setting from the earliest beginnings to modern times. Not

approved for the M.A. in mathematics degree. (*Fall*) (*Evenings*)

MATH 5128. Applied Probability I. (3) Prerequisite: MATH/STAT 3122 and MATH 2171 or permission of the department. Finite and countable Markov chains, Markov Decision Processes, and optimal stopping. Other topics selected from: queuing theory, inventory models, reliability theory, game theory, recurrent events, information theory, stochastic control, stochastic control with incomplete information and Kalman filtering. (*Fall*)

MATH 5129. Applied Probability II. (3) Prerequisite: MATH 5128 or permission of the department. Continuation of MATH 5128. (*On demand*)

MATH 5143. Analysis I. (3) Prerequisite: MATH 3141 with a grade of B or better, or permission of the department. First course of a two-semester sequence providing a rigorous treatment of continuity, differentiability and integration of functions of one and several real variables. (*Fall*)

MATH 5144. Analysis II. (3) Prerequisite: MATH 5143 with a grade of B or better or permission of the department. Continuation of MATH 5143. (*Spring*)

MATH 5161. Number Theory. (3) Prerequisite: MATH 3163 with a grade of C or better or permission of the department. A study of the elements of classical number theory including divisibility, congruences, diophantine equations, prime numbers and their distribution, quadratic reciprocity, number-theoretic functions, and famous unsolved problems. Not approved for the M.A. in mathematics degree. (*Spring*) (*Alternate years*)

MATH 5163. Modern Algebra. (3) Prerequisite: MATH 3163 or permission of the department. Groups, rings, integral domains, fields. (*Fall*)

MATH 5164. Abstract Linear Algebra. (3) Prerequisite: MATH 3163 and 2164 or permission of the department. Vector spaces over arbitrary fields, linear transformations, canonical forms, multilinear algebra. (*Spring*)

MATH 5165. Numerical Linear Algebra. (3) Prerequisites: ITCS 1214, MATH 2164 and 2171, all with a grade of C or better, or permission of the department. Gaussian elimination and LU decomposition methods for linear systems. Vector and matrix norms, condition numbers and accuracy of solutions. Solutions of large sparse matrix systems using skyline solvers, and Jacobi, Gauss-Seidel, and SOR iterative methods. Solution of nonlinear systems. Least squares methods using the QR factorization. Selected problems will be programmed for computer solution. (*Fall*) (*Alternate years*)

MATH 5171. Numerical Solution of Ordinary Differential Equations. (3) Prerequisites: ITCS 1214, MATH 2241, 2164, and 2171, all with a grade of C or better, or permission of the department. Numerical solution

techniques for ordinary differential equations such as Runge-kutta, multistep and extrapolation methods. Stiff solvers and stability criteria. Comparative work with modern robust codes and visualization methods. (*On demand*)

MATH 5172. The Finite Element Method. (3)
Prerequisites: ITCS 1214, MATH 2241, 2164, and 2171, all with a grade of C or better, or permission of the department. Boundary value problems and their variational form. Finite element basis functions, computational techniques, isoparametric elements and curved boundaries, alternate methods, singular problems, eigenvalue problems. Some practical experience with an F.E.M. program and graphical output. (*Spring*) (*Alternate years*)

MATH 5173. Ordinary Differential Equations. (3)
Prerequisites: MATH 2171 and MATH 3142, or permission of the department. Existence and uniqueness theorems for initial value problems; continuous dependence of solutions on initial values and right hand sides; linear differential equations in R^2 and R^n ; non-linear differential equations in R^2 and R^n : phase portraits, singularities, cycles; invariant manifolds; linearization; singularities of planar systems; Lyapunov stability; examples: van der Pol oscillator, Liénard systems, Volterra-Lotka equations. (*Spring*)

MATH 5174. Partial Differential Equations. (3)
Prerequisites: MATH 2164 and MATH 3141, or permission of department. Classification of types of partial differential equations. Separation of variables, Sturm-Liouville problems, boundary and eigenvalue problems, fundamental solutions and Green's theorem, Fourier series and integrals, Laplace transforms. (*Fall*)

MATH 5176. Numerical Methods for Partial Differential Equations. (3) Prerequisite: ITCS 1214, MATH 2241, 2164, and 2171 all with a grade of C or better, or permission of the department. Basic finite difference schemes for the solutions of elliptic, parabolic and hyperbolic equations. Van Neuman analysis, characteristics, boundary conditions. (*Fall*) (*Alternate years*)

MATH 5181. Introduction to Topology. (3) Prerequisite: MATH 2164 with a grade of C or better. Topics from set theory and point set topology such as cardinality, order, topological spaces, metric spaces, separation axioms, compactness and connectedness. (*Fall*) (*Alternate years*)

MATH 5691. Seminar. (1-6) Prerequisite: permission of the department. Individual or group investigation and exposition of selected topics in mathematics. (*On demand*)

MATH 5692. Seminar. (1-6) Prerequisite: permission of the department. A continuation of MATH 5691. (*On demand*)

MATH 6004. Topics in Analysis. (3) Prerequisite: MATH 6101 or permission of department. Topics in analysis

selected so as to complement regular course offerings in this area of mathematics. May be repeated for credit with the permission of department. (*On demand*)

MATH 6008. Topics in Geometry and Topology. (3)
Prerequisite: permission of department. Topics selected from Euclidean geometry, non-Euclidean geometry, projective geometry, differential geometry, point-set topology, algebraic topology. May be repeated for credit with approval of department. (*On demand*)

MATH 6050. Topics in Mathematics. (3) Prerequisite: permission of the department. Topics chosen from applied mathematics applicable to other disciplines.

MATH 6100. Foundations of Mathematics. (3)
Prerequisite: permission of department. Logic, sets and axiomatic systems. (*Fall, Summer*) (*Alternate years*)

MATH 6101. Foundations of Real Analysis. (3)
Prerequisite: MATH 6100 or permission of department. Axiomatic and historical development of the real and complex numbers; rigorous development of limits and continuity of functions, intermediate and extreme value theorems. (*Fall*) (*Alternate years*)

MATH 6102. Calculus from an Advanced Viewpoint. (3)
Prerequisite: MATH 6101 or its equivalent. A continuation of MATH 6101. A rigorous approach to differentiation and integration of functions of one real variable. (*Spring*) (*Alternate years*)

MATH 6103. Computer Techniques and Numerical Methods. (3) Prerequisite: MATH 6101 or permission of department. Computer systems, programming, and the computer solution of numerical problems. (*Summer*) (*Alternate years*)

MATH 6105. Problem Solving in Discrete Mathematics. (3) Prerequisite: permission of department. Propositional and predicate calculus, counting techniques, partially ordered sets, lattices, graphs and trees. (*Alternate years*)

MATH 6106. Modern Algebra. (3) Prerequisite: MATH 3163 or its equivalent or permission of department. Topics chosen from group theory, rings and ideals, integral domains, fields and elementary Galois theory. (*Summer*) (*Alternate years*)

MATH 6107. Linear Algebra. (3) Prerequisite: MATH 2164 or its equivalent or permission of department. Systems of linear equations, matrices, vector spaces, linear transformations, determinants, canonical forms of matrices, inner products. (*Summer*) (*Alternate years*)

MATH 6118. Non-Euclidean Geometry. (3) Prerequisite: permission of department. History of Euclid's Fifth Postulate and attempts to prove it; work of Gauss, Bolyai, Lobachevsky and others; systematic development of hyperbolic geometry; relative consistency of hyperbolic

geometry; relative consistency of hyperbolic and Euclidean geometries. (*Alternate years*)

MATH 6171. Advanced Applied Mathematics I. (3)

Prerequisites: MATH 2241 and 2171 with grades of C or better, or permission of department. Power series solutions of ordinary differential equations, vector calculus, line and surface integrals, partial differential equations and Fourier integrals. (*Fall*) (*Evenings*)

MATH 6172. Advanced Applied Mathematics II. (3)

Prerequisites: MATH 2241 and 2171 with grades of C or better or permission of department. Complex analysis; probability and statistics. (*Spring*) (*Evenings*)

MATH 6201. Statistical Techniques in Finance. (3) This course reviews basic concepts and introduces more advanced techniques from Probability and Statistics which are commonly utilized in mathematical finance. Topics covered include random variables, distributions, conditional expectations, confidence intervals and hypothesis testing, simple and multiple regression, multivariate analysis including factor and canonical correlation analysis, and time series models including ARMA, ARIMA, ARCH, and GARCH.

MATH 6202. Derivatives II: Partial Differential Equations for Finance. (3)

This course deals with those partial differential equations which are associated with financial derivatives based on factors such as equities and spot interest rates.

MATH 6203. Stochastic Calculus for Finance. (3)

An introduction to those aspects of partial differential equations and diffusion processes most relevant to finance, Random walk and first-step analysis, Markov property, martingales and semi-martingales, Brownian motion. Stochastic differential equations: Ito's lemma, backward and forward Kolmogorov equations, the Feynman-Kac formula, stopping times, Hull and White Models, Cox-Ingersoll-Ross Model. Applications to finance including portfolio optimization and option pricing.

MATH 6204. Numerical Methods for Financial Derivatives. (3)

This course will introduce students to numerical and computational techniques for solving both European- and American-style financial derivatives. The approach will be the finite difference method and the basic theoretical concepts will be introduced. Final projects will involve implementing the techniques on computers. Some spectral and Monte Carlo methods will also be discussed.

MATH 6205. Financial Computing. (3) This lab oriented course introduces the numerical methods needed for quantitative work in finance, focusing on derivative pricing and fixed income applications. Topics include binomial and trinomial methods, Crank-Nicholson methods for various exotic options, treatment of discrete dividends, numerical methods for stochastic differential equations, random number generators, Monte-Carlo methods for European

and American options. The computing class teaches theory and practice of numerical finance as well as the programming skills needed to build software systems in C/C++, Java, Javascript, and Mathematica/Matlab.

MATH 6609. Seminar. (1-3) Prerequisite: permission of the department. A series of regularly scheduled meetings in which each student will present one or more topics selected by the instructor. May be repeated for credit with the permission of department. (*On demand*)

MATH 7028. Topics in Probability. (3)

Prerequisite: MATH 7120 and 7121, or permission of department. Topics of current interest in probability and advanced topics in probability. May be repeated for credit with the permission of the department. (*On demand*)

MATH 7050. Topics in Mathematics. (2-3) Prerequisite: permission of department. Topics chosen from such fields as algebra, topology, analysis, applied mathematics, differential geometry, mathematical physics, graph theory, probability, statistics. May be repeated for credit as topics vary and with the approval of the department. (*On demand*)

MATH 7065. Topics in Applied Algebra and Algebraic Structures. (3)

Prerequisite: permission of the department. Current topics in Applied Algebra and Algebraic Structure. (*On demand*)

MATH 7070. Topics in Numerical Analysis. (3)

Prerequisite: permission of the department. Topics of current interest in numerical analysis. May be repeated for credit with the permission of the department. (*On demand*)

MATH 7071. Topics in Differential Equations. (3)

Prerequisite: permission of the department. Topics of current interest in ODE, PDE, dynamical systems, inverse problems and related subjects. May be repeated for credit with the permission of the department. (*On demand*)

MATH 7120. Probability Theory I. (3)

Prerequisites: MATH 7143 and MATH/STAT 3122 or permission of department. Topics include probability spaces, probability measures, sigma-algebras, characteristic functions, sequences of random variables, law of large numbers, general forms of the Central Limit Theorem. (*Fall*) (*Alternate years*)

MATH 7121. Probability Theory II. (3)

Prerequisite: MATH 7120 or permission of the department. A continuation of MATH 7120. (*On demand*)

MATH 7125. Stochastic Processes I. (3)

Prerequisites: MATH 3122, 7120, and 7143, or permission of the department. Basic ideas in the study of stochastic processes, selected from: discrete and continuous time Markov processes, stationary and renewal processes, applications to queuing theory, reliability theory, stochastic differential equations, time-series analysis, filtering and stochastic control theory. (*On demand*)

MATH 7126. Stochastic Processes II. (3) Prerequisite: MATH 7125. A continuation of MATH 7125. (*On demand*)

MATH 7141. Complex Analysis I. (3) Prerequisite: MATH 5143 or permission of the department. Holomorphic functions, complex integration, residues, entire and meromorphic functions, conformal mapping, harmonic functions. (*Spring*) (*Alternate years*)

MATH 7142. Complex Analysis II. (3) Prerequisite: MATH 7141. A continuation of MATH 7141. (*On demand*)

MATH 7143. Real Analysis I. (3) Prerequisite: MATH 5144 or permission of the department. Lebesgue integration on the real line, L_p spaces, introduction to general measure and integration theory. (*Fall*)

MATH 7144. Real Analysis II. (3) Prerequisite: MATH 7143 or permission of the department. A continuation of MATH 7143. (*Spring*)

MATH 7147. Applied Functional Analysis. (3) Prerequisite: MATH 5144. Introduction to functional analysis and its applications to such areas as linear and non-linear differential equations, integral equations, and control theory. Topics chosen from Banach spaces, operators, the Hahn-Banach, open mapping and closed graph theorems, Sobolev spaces, spectral theory, operators in Hilbert space. (*On demand*)

MATH 7148. Functional Analysis. (3) Prerequisite: MATH 7144 or permission of the department. Material selected from: spectral theory, spectral theory of differential operators, groups and semigroups of operators, nonlinear functional analysis, asymptotic analysis, integral equations, Fourier analysis, distributions, and Sobolev spaces. (*Fall*)(*Alternate years*)

MATH 7163. Modern Algebra I. (3) Prerequisite: MATH 4163 and 4164 or permission of department. Topics will be selected from Galois theory, commutative algebra, modules, ring theory, homological algebra. (*Fall*) (*Alternate years*)

MATH 7164. Modern Algebra II. (3) Prerequisite: MATH 7163. A continuation of MATH 7163. (*On demand*)

MATH 7172. Partial Differential Equations. (3) Prerequisite: MATH 5174 and 7144 or permission of department. Harmonic functions, mean-value theorem, maximum principle, Green's representation for the solution of the Dirichlet problem for Laplace's equation; Poisson's equations and the Poisson formula; statement and proof of the existence theorem for general second-order elliptic operators, generalized maximum principles; Sobolev spaces. Evolution equations involving elliptic operators, such as the heat or wave equations, may also be introduced. (*Spring*) (*Alternate years*)

MATH 7173. Evolution Equations. (3) Prerequisite: MATH 7144 and 7172 or permission of the department. Semigroups of operators and their generators, examples of semigroups. The heat equation, examples of elliptic operators that generate semigroups, Hille-Yosida theory, analytic semigroups; examples, fractional powers of operators. (*On demand*)

MATH 7174. Linear and Non-Linear Waves. (3) Prerequisite: MATH 5124 and 7144 or permission of the department. Hyperbolic waves, characteristics, Riemann invariants, conservation laws, weak solutions, shock structure. Burger's equation, gas dynamics, dispersive waves, group velocity, water waves, non-linear optics. (*On demand*)

MATH 7175. Inverse Problems. (3) Prerequisite: MATH 7144 and MATH 5174 or permission of the department. Ill-posed problems and numerical methods for them. Applications of inverse problems to real processes. One dimensional inverse problems. Multi-dimensional inverse problems: uniqueness and numerical methods. Inverse scattering problems. (*On demand*)

MATH 7176. Advanced Numerical Analysis. (3) Prerequisites: MATH 2164, 2171 and 5176 or permission of the department. A selection of topics from such areas as iterative methods of solving linear and non-linear systems of equations, approximation theory, splines, and finite element methods for partial differential equations. (*Spring*) (*Alternate years*)

MATH 7177. Applied Optimal Control. (3) Prerequisites: MATH 5143 or permission of the department. Examples of control systems and optimization problems, optimal control of discrete-time systems, solutions of the general discrete-time optimization problem, optimal control of continuous-time systems, the calculus of variations, solution of the general continuous optimization problem, applications of the Pontryagin Maximum Principle, Dynamic programming, and Bang-bang control. Controllability and differential games may also be introduced. (*Spring*) (*Alternate years*)

MATH 7178. Computational Methods for Fluid Dynamics. (3) Prerequisites: MATH 2242, 2171, 5174 and 5176 or permission of the department. Topics on various numerical techniques for the solution of incompressible and compressible flows. Finite difference, finite element and spectral methods, and shock capturing and fitting methods. Multi-grid method and acceleration techniques. (*On demand*)

MATH 7179. Advanced Finite Difference Methods. (3) Prerequisite: permission of the department. Accuracy analysis and design of high order schemes, stability theory of schemes with variable coefficients, stability theory of schemes for initial-boundary value problems, convergence theory for nonlinear cases. (*On demand*)

MATH 7181. Topology I. (3) Prerequisite: permission of department. Topological spaces, continuous functions, connectedness, compactness, and metrizable, and further topics from point-set, geometric or algebraic topology. (*On demand*)

MATH 7182. Topology II. (3) Prerequisite: MATH 7181. A continuation of MATH 7181. (*On demand*)

MATH 7184. Differential Geometry I. (3) Prerequisite: permission of the department. Manifolds, differential structures, tangent bundles, embeddings, immersions, inverse function theorem, Morse-Sard theorem, transversality, Borsuk-Ulam theorem, vector bundles, Euler characteristics, Morse theory, Stokes theorem, Gauss-Bonnet theorem, Whitney embedding theorem. (*On demand*)

MATH 7185. Differential Geometry II. (3) Prerequisite: permission of the department. Differentiable manifolds, differential forms, critical points, local and global theory of curves, local and global theory of surfaces, connections, geodesics, curvature, spaces of constant curvature, Lie groups and Lie algebras. (*On demand*)

MATH 7273. Advanced Finite Element Analysis. (3) Prerequisite: MATH 5172 and 5174 or permission of the department. Selection of topics from such areas of finite element analysis as convergence theorems (Ciarlet), hierarchical basis functions, the h-p method, adaptive grid techniques and solution methods for nonlinear equations. (*On demand*)

MATH 7275. Dynamical Systems I. (3) Prerequisites: MATH 5143 and MATH 5173 or permission of the department. Cycles and separatrix cycles, Poincaré first-return map: diffeomorphisms, Poincaré-Bendixson Theory, flows on the two-torus; structural stability, genericity, Peixoto's theorem; singularities of planar systems. Degenerate singularities, Hopf bifurcation, saddle-node bifurcation, center bifurcation. (*On demand*)

MATH 7276. Dynamical Systems II. (3) Prerequisite: MATH 7275 or permission of the department. Method of averaging, Melnikov functions, hyperbolic structure, symbolic dynamics, homoclinic and heteroclinic orbits, global bifurcations, infinite dimensional dynamical systems, inertial manifolds, Lyapunov exponents and dimension of attractors, codimension-two bifurcations, Duffing's equation, Lorenz equations, finite dimensional systems of dimension at least three. (*On demand*)

MATH 7277. Bifurcation Theory. (3) Prerequisite: MATH 7275 or permission of the department. Implicit function theorem, manifolds and transversality, Newton polygons, Lyapunov center theorem, variational methods, Ljusternik-Schnirelman theory, mountain-pass theorem, bifurcations with one-dimensional null-spaces, Morse theory and global bifurcations, geometric theory of partial differential equations. (*On demand*)

MATH 7691. Research Seminar. (1-3) Prerequisite: permission of department. A seminar in which independent study may be pursued by the student or a group of students under the direction of a professor. May be repeated for credit. (*On demand*)

MATH 7692. Research Seminar. (1-3) Prerequisite: permission of department. A continuation of MATH 7691. May be repeated for credit. (*On demand*)

MATH 7890. Industrial Internship. (0-6) Prerequisites: completion of six hours of coursework in MATH/STAT/OPRS graduate courses and permission of the Department of Mathematics and Statistics. Full- or part-time academic year or summer internship in mathematics and/or statistics complementary to the student's major course of study and designed to allow theoretical and course-based practical learning to be applied in a supervised industrial experience. Each student's program must be approved by the department's graduate coordinator. Requires a mid-term report and final report to be graded by the supervising faculty. Grading shall be designated as "Pass/Unsatisfactory" and credit hours gained from the internship shall not be counted toward the courses leading to advancement to candidacy. (*On demand*)

MATH 7893. Thesis. (0-3) Prerequisite: permission of department. Subject to the approval of the department Graduate Committee, the thesis may be original work, work of an expository nature, or the mathematical formulation and solution of a particular industrial or business problem suggested by the career interests of the student. The thesis must be defended in an oral presentation. May be repeated for credit with the permission of department. (*On demand*)

MATH 7999. Master's Degree Graduate Residency Credit. (1) (*Fall, Spring, Summer*)

MATH 8028. Topics in Probability. (3) See MATH 7028 for Course Description.

MATH 8050. Topics in Mathematics. (2-3) See MATH 7071 for Course Description.

MATH 8065. Topics in Applied Algebra and Algebraic Structures. (3) See MATH 7065 for Course Description.

MATH 8070. Topics in Numerical Analysis. (3) See MATH 7070 for Course Description.

MATH 8071. Topics in Differential Equations. (3) See MATH 7071 for Course Description.

MATH 8120. Probability Theory I. (3) See MATH 7120 for Course Description.

MATH 8121. Probability Theory II. (3) See MATH 7121 for Course Description.

MATH 8125. Stochastic Processes I. (3) See MATH 7125 for Course Description.

MATH 8126. Stochastic Processes II. (3) See MATH 7126 for Course Description.

MATH 8141. Complex Analysis I. (3) See MATH 7141 for Course Description.

MATH 8142. Complex Analysis II. (3) See MATH 7142 for Course Description.

MATH 8143. Real Analysis I. (3) See MATH 7143 for Course Description.

MATH 8144. Real Analysis II. (3) See MATH 7147 for Course Description.

MATH 8147. Applied Functional Analysis. (3) See MATH 7147 for Course Description.

MATH 8148. Functional Analysis. (3) See MATH 7148 for Course Description.

MATH 8163. Modern Algebra I. (3) See MATH 7163 for Course Description.

MATH 8164. Modern Algebra II. (3) See MATH 7164 for Course Description.

MATH 8172. Partial Differential Equations. (3) See MATH 7172 for Course Description.

MATH 8173. Evolution Equations. (3) See MATH 7173 for Course Description.

MATH 8174. Linear and Non-linear Waves. (3) See MATH 7174 for Course Description.

MATH 8175. Inverse Problems. (3) See MATH 7175 for Course Description.

MATH 8176. Advanced Numerical Analysis. (3) See MATH 7176 for Course Description.

MATH 8177. Applied Optimal Control. (3) See MATH 7177 for Course Description.

MATH 8178. Computational Methods for Fluid Dynamics. (3) See MATH 7178 for Course Description.

MATH 8181. Topology I. (3) See MATH 7181 for Course Description.

MATH 8182. Topology II. (3) See MATH 7182 for Course Description.

MATH 8184. Differential Geometry I. (3) See MATH 7184 for Course Description.

MATH 8185. Differential Geometry II. (3) See MATH 7185 for Course Description.

MATH 8273. Advanced Finite Element Analysis. (3) See MATH 7273 for Course Description.

MATH 8275. Dynamical Systems I. (3) See MATH 7276 for Course Description.

MATH 8276. Dynamical Systems II. (3) See MATH 7276 for Course Description.

MATH 8277. Bifurcation Theory. (3) See MATH 7277 for Course Description.

MATH 8691. Research Seminar. (1-3) See MATH 7691 for Course Description.

MATH 8692. Research Seminar. (1-3) See MATH 7692 for Course Description.

MATH 8890. Industrial Internship. (0-6) See MATH 7890 for Course Description.

MATH 8994. Doctoral Research and Reading. (0-9) Prerequisite: permission of the department. May be repeated for credit. (*On demand*)

MATH 8999. Doctoral Dissertation Research. (1) Prerequisite: Advancement to Candidacy. Individual investigation and research leading to the preparation of a doctoral dissertation. May be repeated for credit. (*Fall, Spring, Summer*)

MATH 9999. Doctoral Degree Graduate Residency Credit. (1) (*Fall, Spring, Summer*)

Mathematics Education

MAED 5000. Topics in Mathematics Education, Early Childhood. (1-6) Prerequisite: permission of the department. Course may be repeated for credit as topics vary. (*On demand*)

MAED 5040. Topics in Mathematics Education, Intermediate. (1-6) Prerequisite: permission of the department. Course may be repeated for credit as topics vary. (*On demand*)

MAED 5070. Topics in Mathematics Education, Secondary. (1-6) Prerequisite: permission of the department. Course may be repeated for credit as topics vary. (*On demand*)

MAED 5101. Arithmetic in the School. (3) Prerequisite: MATH 1100 or equivalent. A study of the number systems with emphasis placed upon the basic concepts and meanings, properties of addition, multiplication, inverses, systems of numeration and number line appropriate for each

grade. (Does not count toward a major in mathematics. Open only to transfer students who have completed six semester hours of mathematics at another university.) (*On demand*)

MAED 5104. Microcomputing for Teachers. (3)
Prerequisites: working knowledge of college algebra and trigonometry, and permission of department. Introduction to basic computer concepts, to microcomputer systems, to the design and development of programs to assist instruction in mathematics and computer sciences. A programming language such as BASIC or LOGO will be used. Each student will integrate skills learned by selecting, designing and developing a specific project. (No prior experience with computer programming required.) (*Spring Evenings*)

MAED 5105. Geometry for Teachers. (3) Prerequisite: MATH 2102 or MAED 5101 or permission of department. A study of the foundations of Euclidean geometry and a brief treatment of non-Euclidean geometry. Emphasis on learning activities and teaching techniques for teachers of mathematics K-12. (*Spring Evenings*)

MAED 5141. Mathematics for the Intermediate School Teacher. (3) Prerequisite: MATH 2102 or permission of department. A study of the algebraic properties of the real numbers; functions, equations, inequalities and their graphs, activities and applications related to upper elementary and intermediate grades. (*Fall Evenings*)

MAED 6122. Theoretical Foundations of Learning Mathematics. (3) Prerequisite: Students must be enrolled in the Master of Arts in Mathematics Education Program. Introductions to theories of learning that have influenced the teaching of mathematics in K-12. An overview of theories that have guided reforms in mathematics teaching; contemporary constructivist theories of mathematics learning. (*Alternate years*)

MAED 6123. Research in Mathematics Education. (3) Prerequisite: Students must be enrolled in the Master of Arts in Mathematics Education Program. An introduction and overview of research in the teaching and learning of mathematics in K-12. Overview of contemporary research perspectives and paradigms; interpreting and synthesizing the research literature; survey of contemporary research problems in mathematics teaching and learning; development of classroom-based research studies. (*Alternate years*)

MAED 6124. Issues in the Teaching of Secondary School Mathematics. (3) Prerequisite: Students must be enrolled in the Master of Arts in Mathematics Education Program. Study of major issues affecting secondary mathematics education: analysis of the impact of learning theories on methods of teaching; assessment methods for improving mathematics learning; analysis of the historical and programmatic development of the secondary school mathematics curriculum leading to current trends, issues,

and problems; and analysis of the role of technology in the secondary mathematics classroom. (*Alternate years*)

MAED 8124. Advanced Topics in Mathematics Education. (3) Prerequisite: Enrollment in the Mathematics Education specialization of the Doctoral Program in Curriculum and Instruction. Advanced research topics in the teaching and learning of mathematics. Includes a survey, interpretation, and synthesis of contemporary research problems in mathematics teaching and learning. Can be repeated for credit. (*On demand*)

MAED 8160. Readings in Mathematics Education. (3) Prerequisite: Enrollment in the Mathematics Education specialization of the Doctoral Program in Curriculum and Instruction. Readings in the teaching and learning of mathematics K-16; analysis of the historical development of the K-16 mathematics curriculum leading to current trends, issues, and problems; theory, methods, and techniques for assessment; and analysis of contemporary issues impacting the teaching of mathematics. (*On demand*)

Statistics

STAT 5123. Applied Statistics I. (3) Prerequisites: MATH 2164 with a grade of C or better and junior standing, or permission of department. Review of stochastic variables and probability distributions, methods of estimating a parameter, hypothesis testing, confidence intervals, contingency tables. Linear and multiple regression, time series analysis. (*Fall*)

STAT 5124. Applied Statistics II. (3) Prerequisite: STAT 5123 or permission of the department. Single factor analysis of variance. Multi-factor analysis of variance. Randomized complete-block designs, nested or hierarchical designs, Latin squares, factorial experiments. Design of experiments. (*Spring Alternate years*)

STAT 5126. Theory of Statistics I. (3) Prerequisite: STAT 3123 or permission of the department. Survey of the mathematical structure supporting applied statistics. Discrete and continuous distributions, moment-generating functions, sampling, point estimation, the multivariate normal distribution, sampling distributions. (*Fall*)

STAT 5127. Theory of Statistics II. (3) Prerequisite: STAT 5126 or permission of the department. Point and interval estimations, hypothesis testing, regression and linear hypotheses, experimental designs and analysis, distribution-free methods. (*Spring*)

STAT 6027. Topics in Statistics. (3) Prerequisite: permission of the department. Topics chosen from applied statistics applicable to other disciplines.

STAT 6127. Introduction to Biostatistics. (3) Prerequisites: MATH 1100 and STAT 1221 or permission of the department. Descriptive statistics and exploratory data analysis; basic probability models and the concept of random variables; point and interval estimation; hypothesis

testing (one- and two-sample problems); simple linear regression and ANOVA; selection of appropriate methods for analysis; development of skills to conduct analysis of data; development of the capability to present the results of a study in scientific language.

STAT 7027. Topics in Statistics. (3) Prerequisite: permission of the department. Topics of current interest in statistics and/or applied statistics. May be repeated for credit with permission of the department. (*On demand*)

STAT 7122. Advanced Statistics I. (3) Prerequisite: MATH 7143 and STAT 5127 or permission of department. A survey of frequently used statistical techniques selected from: estimation theory and hypothesis testing, parametric goodness-of-fit criterion and tests for independence, measures of association, regression techniques, multi-sample inferential techniques, Bayes and minimax estimation, admissibility, minimax property. (*On demand*)

STAT 7123. Advanced Statistics II. (3) Prerequisites: STAT 7122 or permission of the department. Hypothesis testing, Neyman-Pearson Lemma, UMP tests, UMP unbiased tests, monotone likelihood ratio families of distributions, UMP invariant tests. Confidence bounds and regions, uniformly most accurate bounds, regression models, least squares estimates, normal equations, Gauss-Markov theorem. Large sample behavior of methods of moments estimates, maximum likelihood estimates, likelihood ratio tests, Chi-square tests, approximate confidence regions for large samples. (*On demand*)

STAT 7124. Sampling Theory. (3) Prerequisite: STAT 5126 or permission of the department. Methods and theory of survey sampling: simple, systematic, stratified, cluster multistage and specialized sampling schemes and the problems of their implementation and analysis. (*On demand*)

STAT 7127. Linear Statistical Models. (3) Prerequisites: MATH 2164 and 3123 or permission of the department. A selection of topics from the following list: distribution and quadratic forms, regression, dummy variables, models not of full rank, the two-way crossed classification, time series. (*Fall*) (*Alternate years*)

STAT 7133. Multivariate Analysis. (3) Prerequisite: STAT 5126 and 5127 or permission of the department. Multivariate distributions. Inference for the multivariate normal model. Further topics from the following: principal components, factor analysis, multidimensional scaling, canonical correlation, discriminant analysis, cluster analysis, multivariate linear models, special topics. (*Spring*) (*Alternate years*)

STAT 7890. Industrial Internship. (0-6) Prerequisites: completion of six hours of coursework in MATH/STAT/OPRS graduate courses and permission of the Department of Mathematics and Statistics. Full- or part-time academic year or summer internship in

mathematics and/or statistics complementary to the student's major course of study and designed to allow theoretical and course-based practical learning to be applied in a supervised industrial experience. Each student's program must be approved by the department's graduate coordinator. Requires a mid-term report and final report to be graded by the supervising faculty. Grading shall be designated as "Pass/Unsatisfactory" and credit hours gained from the internship shall not be counted toward the courses leading to advancement to candidacy. (*On demand*)

STAT 8027. Topics in Statistics. (3) See STAT 7027 for Course Description.

STAT 8122. Advanced Statistics I. (3) See STAT 7122 for Course Description.

STAT 8123. Advanced Statistics II. (3) See STAT 7123 for Course Description.

STAT 8124. Sampling Theory. (3) See STAT 7124 for Course Description.

STAT 8127. Linear Statistical Models. (3) See STAT 7127 for Course Description.

STAT 8133. Multivariate Analysis. (3) See STAT 7133 for Course Description.

STAT 8890. Industrial Internship. (0-6) See STAT 7890 for Course Description.

Nanoscale Science

- **Ph.D. in Nanoscale Science**

Department of Chemistry

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<http://nanoscalescience.uncc.edu>

Program Coordinator

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PH.D. IN NANOSCALE SCIENCE

The Ph.D. in Nanoscale Science at UNC Charlotte is an interdisciplinary program that addresses the development, manipulation, and use of materials and devices on the scale of roughly 1-100 nanometers in length, and the study of phenomena that occur on this size scale. The program prepares students to become scholarly, practicing scientists who possess the critical thinking, methodological, and communication skills required to advance and disseminate knowledge of fundamental and applied nanoscale science.

The many challenges and opportunities that nanoscale science presents to society require collaborative, interdisciplinary approaches to research. Students enrolled in UNC Charlotte's Ph.D. program in Nanoscale Science learn about the exciting field of nanoscale science from the perspectives of faculty members of a variety of disciplines and develop an advanced knowledge base of a selected science or engineering discipline. All of the NANO courses are team taught and/or co-developed by teams of faculty members from multiple disciplines. This approach provides students trained in a specific science or engineering field at the undergraduate or master's level with the tools needed to work effectively with scientists and engineers from other disciplines on cutting-edge research projects.

Students in the program acquire the knowledge and skills needed to compete effectively for positions in academic, industrial, or government settings by completing interdisciplinary nanoscale science courses and elective courses, participating in program colloquia and seminars, working as a member of a team on projects and research proposals, and making research contributions independently and as part of a team.

Admission Requirements

The following are general guidelines for successful admission into the Ph.D. program in Nanoscale Science:

- 1.) A bachelor's or master's degree in a science or engineering field relevant to nanoscale science is required for admission to full standing in the Ph.D. in Nanoscale Science.
- 2.) A minimum undergraduate grade point average of 3.0 or, if the applicant is currently enrolled in a graduate program or has earned a master's degree, a minimum grade point average of 3.0 in a relevant science or engineering master's program.
- 3.) Admission to the program will require strong scores on the verbal, quantitative, and analytical sections of the Graduate Record Examination. The Graduate Record Examination is a required part of the application package.
- 4.) Three strong, positive letters of recommendation, at least two of which must come from faculty in the

applicant's current or previous academic program. All letters should be written by individuals in a position to judge the applicant's likely success in a Ph.D. level program. Letters should address the applicant's suitability for a Ph.D. program and ability to complete the program in a timely manner.

- 5.) Admission of students who are not native English speakers will require strong scores on the TOEFL exam. The TOEFL exam is a required part of the application for non-native English speakers.

Documents to be submitted for application for admission

- 1.) Official transcripts from all colleges and universities attended (indicating completion of a bachelor's degree in a relevant science or engineering discipline)
- 2.) Official GRE scores (verbal, quantitative, and analytical)
- 3.) The UNC Charlotte application for graduate admission form
- 4.) Three letters of reference from academics who have taught or worked directly with the applicant
- 5.) An essay that addresses professional goals and motivation for pursuing the degree, suitability for the program, and career goals following the program
- 6.) TOEFL scores (if the applicant is not a native English speaker)

Admission assessment

An admissions committee will review applications and recommend to the Program Director whether each applicant should be admitted and, if so, under what conditions.

Admission to Candidacy Requirements

After completing the appropriate core courses and at least three elective courses, each student delivers and defends an oral presentation that addresses research completed or in progress, plus proposed research for completion of the dissertation. The presentation/defense is delivered to the student's dissertation committee. The student is questioned by the committee about his/her research, plus material from any relevant graduate level courses the student has completed. Students who fail the exam on the first attempt will be provided a second opportunity to pass it, and will be advised by the committee on how to better prepare for the second attempt. Students who do not pass on the second attempt will be offered the option of obtaining a Master's degree in an appropriate discipline (depending on which electives the student has completed) but will not be allowed to continue on to the Ph.D. degree. Under normal circumstances, students are expected to pass the qualifying exam prior to the sixth semester in residence.

Degree Requirements

The Ph.D. in Nanoscale Science requires 72 credit hours. Core courses account for at least 30 hours, and elective courses account for at least 9 hours. The remaining credit hours are fulfilled by enrolling in Dissertation Research (NANO 8900). A schedule for completing degree

requirements can be found online at <http://nanoscalescience.uncc.edu>.

Core Courses

The Ph.D. program in Nanoscale Science requires the following core courses:

- NANO 8001 Perspectives in Nanoscale Science
- NANO 8101 Introduction to Instrumentation and Processing at the Nanoscale
- NANO 8102 Nanoscale Phenomena
- NANO 8103 Synthesis and Characterization of Nanomaterials
- NANO 8104 Fabrication of Nanomaterials
- NANO 8201 Research Group Rotations
- NANO 8202 Interdisciplinary Team Project
- NANO 8203 Collaborative Research Proposal
- NANO 8681 Nanoscale Science Seminar*
- NANO 8682 Nanoscale Science Colloquium**

* *Students enroll in NANO 8681 during every semester in residence.*

** *Students enroll in NANO 8682 during every semester in residence, except during the semester in which they enroll in NANO 8001.*

Elective Courses

Students complete a minimum of 9 credit hours of elective coursework in a chosen science or engineering discipline (selected from biology, chemistry, electrical and computer engineering, mechanical engineering and engineering science, or physics and optical science), in addition to completing the core courses. Elective courses are selected in consultation with the student's advisor or dissertation advisor and dissertation committee to best meet the student's needs and interests.

Cumulative Exams

Students must pass 6 exams (4 if done during the first year) covering announced topics in nanoscale science. The exams require knowledge of basic principles of nanoscale science and current literature and will be administered monthly. Each student is expected to take the cumulative exam each time it is offered until he/she passes the required number of exams.

General Science Proficiency Exam (GSPE)

The purpose of the GSPE is to ensure that students possess a *working knowledge* of material needed to master concepts in nanoscale science. The exam will cover introductory material in chemistry, physics and mathematics (including calculus). The web page for the Ph.D. in Nanoscale Science (<http://nanoscalescience.uncc.edu>) contains detailed information about the exam, including a list of topics to be covered and sample questions, to assist students in preparing for the exam. The exam will be administered three times per year, in August, January and May. Students are expected to take the GSPE each time it is offered until they pass it. Each student will discuss his/her performance on the GSPE with the Program Director regardless of whether

(s)he passes the exam. The Program Director will indicate to the student any material he/she should study in greater detail and which faculty member the student should consult if he/she requires assistance in learning specific material. Students who do not pass the GSPE by the end of their first year enrolled in the program will be terminated from the program.

Advising/Committees

Students are assigned an academic advisor upon enrolling in the program and will work closely with that advisor on suggested schedules of classes, research options, and other issues important to student success until a research advisor is chosen. Upon selecting a research advisor, students will form a dissertation committee, and will then consult with the research advisor/dissertation committee on program matters.

Grades Required

Graduate students must have a GPA of 3.2 or higher to graduate from the program. Two grades of C or one grade of U will result in termination from the program.

Transfer Credit

Students who have taken graduate coursework but have not earned a graduate degree may transfer up to six semester hours of coursework. Students who have earned a Master's degree may transfer up to 30 semester hours.

Language Requirement

There is no foreign language requirement.

Application for Degree

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar. After successful defense of the dissertation, a student will be conferred with the doctoral degree.

Residency Requirement

Students must satisfy the residency requirement for the program by completing 21 hours of continuous enrollment, such as coursework or dissertation credits. Residence is considered continuous if the student is enrolled in one or more courses in successive semesters until 21 hours are earned.

Time Limits for Completion

The student must achieve admission to candidacy within six years after admission to the program. All requirements for the degree must be completed within eight years after first registration as a doctoral student. These time limits are maximums; full-time students will typically be expected to complete the degree requirements within 4-5 years.

COURSES IN NANOSCALE SCIENCE

NANO 8001. Perspectives at the Nanoscale. (2) NANO program faculty members present and discuss their research in nanoscale science to: (1) demonstrate how scientists from different disciplines approach problem-solving at the nanoscale, and (2) expose students to research opportunities for dissertation work. Students write summaries of the presentations.

NANO 8101. Introduction to Instrumentation and Processing at the Nanoscale. (3) Methods of manipulating, engineering, and characterizing nanoscale materials are introduced; applications and principles of their operation are discussed. Students acquire hands-on experience with selected laboratory methods in preparation for dissertation research. Topics include, but are not limited to, scanning probe and electron microscopy methods, cleanroom technology, nanoscale optical and e-beam lithography, nuclear magnetic resonance, mass spectrometry, luminescence methods, interferometry, gel permeation chromatography, surface area analysis, and small-angle x-ray and neutron scattering.

NANO 8102. Nanoscale Phenomena. (3) Topics include, but are not limited to, scaling phenomena; nano-optics (near-field optics, limits of lithography masks, nano-dots and nanoscale optical interactions); nanoscale mechanics; nanotribology; biological and biologically-inspired machines.

NANO 8103. Synthesis and Characterization of Nanomaterials. (3) Prerequisites: NANO 8101 and NANO 8102. Topics include, but are not limited to, quantum dots, metallic nanoparticles, carbon nanostructured materials and nanotubes, zeolites, organic-inorganic polymers, composite materials, solution-phase colloids, sol-gel process, silica spheres, porous silicon, photonic crystals.

NANO 8104. Fabrication of Nanomaterials. (3) Prerequisite: NANO 8101. Lithographic methods (CVD, PVD, e-beam, ion beam, magnetron, evaporation, spin coating, mask fabrication, developing resists); microelectromechanical systems and nanoelectromechanical systems; limits of conventional mechanical processing, electroforming, growth mechanisms (organic, inorganic, thermal); powders.

NANO 8201. Research Group Rotations. (1) Students interact on a regular basis with selected research groups in nanoscale science from at least three different departments at UNC Charlotte. Specific activities range from meeting with the group's professor and/or other group members, attending group meetings, and observing laboratory experiments and procedures. Research groups are chosen so that each student is exposed to an array of research activities of the Nanoscale Science faculty. At the end of each rotation, the visiting student delivers a presentation to the

visited research group, describing what the student learned about the visited group's research activities.

NANO 8202. Interdisciplinary Team Project. (2) Corequisite: NANO 8682. An encapsulated, semester-long research experience designed to introduce students to laboratory work in nanoscale science. Students work, in interdisciplinary teams of 2-4 students, on a short research project and present their results during a meeting of the *Nanoscale Science Colloquium*.

NANO 8203. Collaborative Research Proposal. (3) Effective strategies for designing and writing research proposals are presented by program faculty members, and staff from proposal development offices on campus. Students work in teams of 2-3 to prepare an original, interdisciplinary research proposal on a topic in nanoscale science. The proposal conforms to regulations of a selected funding agency and must address a topic that is supported by that agency. Each team consults regularly with a panel of 2-3 faculty members who collectively approve the proposal topic, provide feedback during the development of the proposal, and ultimately evaluate the proposal. The course is designed to increase the ability of students to relate research ideas to fundamental concepts in science and engineering, to help students learn to develop effective methods of presenting ideas and defending them, to help students develop self confidence in their abilities to present and defend ideas, and to improve oral and written communication skills.

NANO 8681. Nanoscale Science Seminar. (1) Students attend weekly seminars of visiting speakers of the Nanoscale Science program or other approved programs on campus. Seminars are selected to best meet the educational needs of the individual student. Students submit for grading summaries of the seminars attended. (May be repeated for credit)

NANO 8682. Nanoscale Science Colloquium. (1) Students present seminars on current topics in nanoscale science to the faculty and student participants of the program. Presentations address dissertation research, the current literature, group projects, and special topics. The colloquium provides an opportunity for students to discuss topics in Nanoscale Science with faculty from all of the participating disciplines. (May be repeated for credit)

NANO 8900. Dissertation Research. (1-4) Research for the dissertation. (May be repeated for credit)

Operations Research

• Graduate Minor in Operations Research

Department of Mathematics & Statistics

376 Fretwell
(704) 687-4929

Coordinator

Dr. Joel Avrin

GRADUATE MINOR IN OPERATIONS RESEARCH

The interdisciplinary graduate minor in Operations Research is designed to provide advanced problem solving skills and knowledge in the general areas of operations research and optimization to enable their application to effectively address the present day problems of business, management science, engineering and computer science. This program can serve as an effective and focused supplement to existing graduate programs in the participating departments. The required courses are offered by the participating departments of Electrical Engineering, Civil & Environmental Engineering, Computer Science, Mechanical Engineering, Economics, and Information & Operations Management.

Admission Requirements

Students admitted to graduate degree programs in the participating departments and the M.B.A. program who are in good standing, are eligible for the minor in Operations Research.

Requirements for the Minor

- 6) Declaration of the minor, preferably by the end of the first semester of graduate study.
- 12) Formation of a Program Committee: Students who elect to minor in Operations Research will select a participating faculty member as a member of their regular graduate committee. A list of participating faculty will be available from the coordinator of the minor in Operations Research.
- 13) Fulfill the requirements of a participative degree program and complete OPRS 6101/8101 and one course each from two of the following areas selected with the advice and knowledge of the student's program committee.

Mathematics: OPRS 5111, 5112, 5113, 5114 MATH 5165, 7125, 7177 and topics: reliability theory, queuing models, variational methods.

Computer Science: ITCS 6160, 6166

Management Information Systems and Operations Management: MBAD 6121, 6122, 6141

Economics: ECON 6100, 6112

Electrical Engineering: ECGR 6111, 6112, 6115, 6116
Civil and Environmental Engineering: CEGR 5090, 6181

Students must have a cumulative 3.0 GPA in courses applied to the minor. Course waivers and transfer credit will be considered on an individual basis.

COURSES IN OPERATIONS RESEARCH

OPRS 5010. Topics in Decision Mathematics. (2-3)

Prerequisite: permission of the department. Topics in decision mathematics selected to supplement regular course offerings in this area of mathematics. May be repeated for additional credit with the approval of the department. Credit for the M.A. degree in mathematics requires approval of the department. (*On demand*)

OPRS 5111. Linear Programming. (3) Prerequisites: OPRS 3111 and ITCS 1214. Mathematical formulation and solution of linear programming problems. Topics include: the simplex method and its variations, sensitivity and parametric analysis, duality, and applications. A project will be required for all graduate students. (*On demand*)

OPRS 5112. Non-Linear Programming. (3) Prerequisites: ITCS 1214, OPRS 3111 and MATH 2241. Basic unconstrained optimization problems, search techniques, some discussion of rates of convergence and an introduction to constrained optimization. Computer implementation and testing of optimization algorithms will be required. A project will be required of all graduate students. (*On demand*)

OPRS 5113. Game Theory. (3) Prerequisites: OPRS 3111 and one of STAT 2122, MATH/STAT 3122, or OPRS 3113. The theory of zero-sum matrix games, mini-max theorem, optimal strategies, symmetric games, economic models, infinite, separable, polynomial, multi-stage, general-sum and n-person games. A project will be required of all graduate students. (*On demand*)

OPRS 5114. Dynamic Programming. (3) Prerequisites: ITCS 1214, OPRS 3111, and one of STAT 2122, MATH/STAT 3122 or OPRS 3113. The identification of dynamic programming problems and their solution in terms of recurrence relations. Elementary path problems, resource allocation, shortest path, traveling salesmen problem, discrete-time optimal control, replacement models and inventory systems. A project will be required of all graduate students. (*On demand*)

OPRS 6101. Introduction to Operations Research. (3) Prerequisite: STAT 3122. Operations Research approach: modeling, constraints, objective and criterion. The problem of multiple criteria, optimization, model validation. The team approach. Systems design. Examples, or methodology: mathematical programming, optimum seeking, simulation,

gaming, heuristic programming. Examples, or applications: theory of inventory, economic ordering under deterministic and stochastic demand. The production smoothing problem, linear and quadratic cost functions. Waiting line problems: single and multiple servers with Poisson input and output. The theory of games for two-person competitive situations. Project management through probabilistic activity networks and deterministic activity network (CPM-PERT). (*On demand*)

OPRS 7125. Stochastic Processes. (3) See description for MATH 7125.

OPRS 8101. Introduction to Operations Research. (3) See description for OPRS 6101.

OPRS 8125. Stochastic Processes. (3) See description for MATH 7125.

Optical Science and Engineering

- **Ph.D. in Optical Science and Engineering**
- **M.S. in Optical Science and Engineering**

Department of Physics and Optical Science

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<http://optics.uncc.edu>

Coordinator

Dr. Robert K. Tyson

Graduate Faculty

Physics and Optical Science

Vasily Astratov, Associate Professor
Andriy Baumketner, Assistant Professor
Angela D. Davies, Assistant Professor
Faramarz Farahi, Professor
Michael A. Fiddy, Professor
Nathaniel Fried, Associate Professor
Greg J. Gbur, Assistant Professor
Tsing-Hua Her, Associate Professor
Donald Jacobs, Associate Professor
Ana Jofre, Assistant Professor
Eric Johnson, Professor
Terrill W. Mayes, Emeritus Professor
Patrick J. Moyer, Associate Professor
M. Yasin Akhtar Raja, Professor
Tom Suleski, Associate Professor
Robert K. Tyson, Associate Professor

Electrical and Computer Engineering

Stephen M. Bobbio, Professor
Lee W. Casperson, Professor
James M. Conrad, Associate Professor
Kasra Daneshvar, Professor
Mohamad A. Hasan, Associate Professor
Raphael Tsu, Professor
Edward B. Stokes, Associate Professor

Chemistry

Bernadette T. Donovan-Merkert, Professor
Thomas D. DuBois, Professor
Kenneth E. Gonsalves, Professor
Mahnaz El-Kouedi, Assistant Professor
Daniel S. Jones, Associate Professor
Joanna K. Krueger, Associate Professor
Jordan C. Poler, Associate Professor
Thomas A. Schmedake, Associate Professor
Wade N. Sisk, Associate Professor

Mathematics

Wei Cai, Professor
Yuri Godin, Assistant Professor
Michael V. Klibanov, Professor
Thomas R. Lucas, Professor
Stanislav Molchanov, Professor
Boris Vainberg, Professor

Mechanical Engineering

Robert J. Hocken, Professor
Stuart T. Smith, Professor

Computer Science

Teresa A. Dahlberg, Associate Professor
M. Taghi Mostafavi, Associate Professor
Kayvan Najarian, Assistant Professor

Engineering Technology

Falih H. Ahmad, Associate Professor

Programs of Study

The M.S. and Ph.D. programs in Optical Science and Engineering are interdisciplinary involving six science and engineering departments and two Centers [Physics & Optical Science, Chemistry, Mathematics, Electrical & Computer Engineering, Mechanical Engineering & Engineering Science, and Computer Science, the Center for Optoelectronics & Optical Communications, and the Center for Precision Metrology.] The program is administered through the Department of Physics & Optical Science. The purpose of the program is to educate scientists and engineers who will develop the next generation of optical technology. The program emphasizes basic and applied interdisciplinary education and research in areas of optics that include:

- Optoelectronic devices and sub-assemblies
- Devices for telecommunications, sensors, and characterization

- Optical materials (semiconductors, polymer-organic and crystalline)
- Optical metrology
- Optical imaging
- Optical communication networks

Applications of this research include:

- Optical telecom and data-com
- High efficiency, tunable narrow bandwidth laser sources and detectors
- Smart structures for distributed sensing
- Wireless technologies for communications and remote sensing
- Materials and surface characterization
- Nanostructured optical devices
- Microelectronics, Biosensing and medical imaging

A complete description of the research activity within the Optical Science and Engineering program can be accessed online at <http://optics.uncc.edu>.

Documents to be Submitted for Admission

- 1) Official transcripts from all colleges and universities attended.
- 2) Official GRE scores.
- 3) Official TOEFL scores (if the previous degree was from a country where English is not the official language).
- 4) The UNC Charlotte application for graduate admission form.
- 5) A minimum of three letters of reference.
- 6) An essay detailing the applicant's motivation and career goals.

PH.D. IN OPTICAL SCIENCE AND ENGINEERING

Additional Admission Requirements

All applicants seeking admission into the Optical Science and Engineering Ph.D. program must fulfill the university's general requirements for graduate admission at the Ph.D. level. Additional requirements for admission into the program are

- 1) A baccalaureate or master's degree in Physics, Chemistry, Mathematics, Engineering, Optics, Computer Science, or a related field with a minimum undergraduate GPA of 3.0 overall and 3.2 (A = 4.0) in the major. In the case a candidate presents a master's degree at application, a minimum graduate GPA of 3.2 (A = 4.0) on all graduate work is required.
- 2) A minimal combined score of 1100 on the verbal and quantitative portions of the GRE and satisfactory scores on the analytical and discipline specialty sections of the GRE.

- 3) A minimum score of 220 (computer-based test) or 557 (paper-based test) or 83 (Internet-based test) on the TOEFL if the previous degree was from a country where English is not the official language.
- 4) Positive letters of recommendation.
- 5) Students may be required to take undergraduate courses determined by the Optics Program Committee on an individual basis. Such courses will be specified at the time of admission into the program.

Degree Requirements

The degree of Doctor of Philosophy in Optical Science and Engineering is awarded for completion of scholarly research that advances the knowledge base in the field of that research. Evidence of this is demonstrated by a successful dissertation defense. Additionally, recipients of this degree should demonstrate mastery of relevant subject matter and a potential for success in future research and teaching.

The minimum requirement for the Ph.D. degree in Optical Science and Engineering is 72 credit hours beyond the baccalaureate degree.

Each candidate for the Ph.D. degree in Optical Science and Engineering must:

- 1) Present evidence of competency in the Core Curriculum
- 2) Complete 2 semesters (2 credit hours) of Seminar (OPTI 8110) during the first 2 semesters of residency and complete 1 semester (1 credit hour) of Seminar (OPTI 8110) during each academic year of residency in the program
- 3) Complete a minimum of 9 credit hours (3 courses) in formal courses having an OPTI prefix in addition to the Core Curriculum
- 4) Complete a minimum of 24 credit hours of dissertation research (OPTI 8991)
- 5) Present a Plan of Study detailing all course and examination requirements
- 6) Successfully complete the written and oral qualifying exam
- 7) Present a Ph.D. Research Plan
- 8) Successfully defend the Ph.D. dissertation

The remaining credit hours must be approved on a case-by-case basis by the student's Advisory Committee and the Optics Program Director.

A student in the Ph.D. program must maintain a minimum GPA of 3.0 in all coursework attempted for the degree. An accumulation of two C grades will result in termination of the student's enrollment in the program. A grade of U earned in any course will result in termination of the student's enrollment in the program.

Admission to Candidacy

Students are admitted to candidacy upon completion of the Core Curriculum with a GPA of 3.4 or better, appointment of a Ph.D. advisor, formation of an Advisory Committee,

presentation of the Plan of Study, successful completion of the Qualifying Exam, and approval of the Research Plan. These steps to candidacy must be completed within two years following admission to the program.

Core Curriculum

All graduates of the program must demonstrate competency in the Core Curriculum. Students may do so by completing the 5 Core Courses with a grade of B or better in each course and a GPA of 3.4 or better in those courses. Failure to demonstrate competency in this manner will result in termination from the program. Well-prepared students may demonstrate competency in the Core Curriculum by earning a grade of pass on one or more of the five sections of a Core examination. In those cases, credit hours that would have been earned in the courses may be replaced by credit hours in OPTI 8991, Dissertation Research, and/or other electives approved by the student's Advisory Committee and the Optics Program Director.

Dissertation Advisor and Advisory Committee

Each student in the program must have a Dissertation Advisor and an Advisory Committee before being admitted to candidacy. The student should select a dissertation advisor before the end of the second year of residency. The student and the dissertation advisor jointly determine the advisory committee. The Dissertation Advisor serves as Chair of the Advisory Committee and must be a member of the Optics Faculty at UNC Charlotte. The advisory committee must have at least 4 members, the majority of which must be members of the Optics Faculty. Composition of the Advisory Committee must be approved by the Optics Program Director and the Dean of the Graduate School.

Plan of Study

All students must prepare a Plan of Study before the end of the third semester following admission to the program. The Plan of Study should show in detail how the student will meet the 72 credit hour minimum. The Plan of Study must be approved by the Advisory Committee.

Qualifying Exam

After successful completion of the Core Curriculum, students will have the opportunity to pass a written and oral qualifying examination administered by the Optics Faculty. Failure to pass the qualifying examination will result in termination from the program.

Research Plan

After successful completion of the Core Curriculum requirement and approval of the Plan of Study, the student will prepare a written Research Plan and an oral defense of that Plan presented in a public seminar. The Research Plan must be approved by the Advisory Committee. The Research Plan must demonstrate: (a) the student's knowledge of the relevant literature base, and (b) a research plan that, if successfully completed, will lead to an approved dissertation. The Research Plan is typically prepared during

1 semester (1 credit hour) of Research Seminar (OPTI8691).

Dissertation

Each student will complete a minimum of 24 credit hours of dissertation research. The student must present a written dissertation to the Advisory Committee. The student must defend the dissertation at a presentation before the Optics Faculty. Upon approval of the written dissertation and oral presentation by the Advisory Committee, the student has successfully completed the dissertation requirement. The dissertation must be written using a format acceptable to the Graduate School.

Residency Requirement

The student must satisfy the residence requirement for the program by completing 20 credit hours of continuous enrollment in coursework/dissertation credit. Residence is considered continuous if the student is enrolled in one or more courses in successive semesters until 20 credit hours are earned.

Time Limit for Completion of Program Requirements

All program requirements must be completed within 8 calendar years from the date the student is admitted into the program.

Transfer Credit Accepted

Up to 30 credit hours of approved coursework may be transferred from other accredited master's and doctoral programs. Only courses in which the student earned a grade of B or better (or its equivalent) can be transferred. No more than 6 credit hours of approved coursework taken as a post-baccalaureate student may be applied toward the degree. Credit for dissertation research cannot be transferred.

Assistantships

Support for beginning graduate students is usually a teaching assistantship. Continuing students are often supported by research assistantships.

Comprehensive Examination

The dissertation defense is the final examination.

Language Requirement

The program has no language requirement.

Core Curriculum

A student in either the M.S. or Ph.D. program should plan to complete the core curriculum, shown below, during the first year of residence. Courses taken after completion of the core curriculum are elective, but must be approved by the student's Advisor and Advisory Committee. Courses in the core curriculum are prerequisites to elective OPTI courses. Students in the M.S. program are to enroll in courses having a 6XXX number. Students in the Ph.D. program are to enroll in courses having an 8XXX number.

Fall

- OPTI6101/8101 Mathematical Methods of Optical Sci & Engineering
 OPTI6102/8102 Principles of Geometrical and Physical Optics
 OPTI6105/8105 Optical Properties of Materials
 OPTI6110/8110 Seminar

Spring

- OPTI 6104/8104 Electromagnetic Waves
 OPTI 6211/8211 Introduction to Modern Optics
 OPTI 6110/8110 Seminar

MASTER OF SCIENCE IN OPTICAL SCIENCE AND ENGINEERING

Additional Admission Requirements

In addition to fulfilling the university's general requirements for graduate admission at the Master's level, all applicants seeking admission into the Optics M.S. program must fulfill the university's general requirements for graduate admission at the M.S. level. Additional requirements for admission into the program are:

- 1) A baccalaureate or master's degree in Physics, Chemistry, Mathematics, Engineering, Optics, Computer Science, or a related field with a minimum undergraduate GPA of 3.0 overall and 3.0 (A = 4.0) in the major.
- 2) A minimal combined score of 1000 on the verbal and quantitative portions of the GRE, and satisfactory scores on the analytical and discipline specialty sections of the GRE.
- 3) A minimum score of 220 (computer-based test) or 557 (paper-based test) or 83 (Internet-based test) on the TOEFL if the previous degree was from a country where English is not the official language.
- 4) Positive letters of recommendation.
- 5) Students may be required to take undergraduate courses determined by the Optics Program Committee on an individual basis. Such courses will be specified at the time of admission into the program.

Degree Requirements

The degree of Master of Science in Optical Science and Engineering is awarded for completion of scholarly research that advances the knowledge base in the field of that research. Evidence of this is demonstrated by a successful thesis defense. Additionally, recipients of this degree should demonstrate mastery of relevant subject matter and a potential for success, usually in a position with government or industry.

The minimum requirement for the M.S. degree in Optical Science and Engineering is 32 credit hours beyond the baccalaureate degree.

Each candidate for the M.S. degree in Optical Science and Engineering must

- 1) Present evidence of competency in the Core Curriculum
- 2) Complete 2 semesters (2 credit hours) of Seminar (OPTI 6110)
- 3) Complete a minimum of 21 credit hours (7 courses) in formal courses which may include the Core Curriculum
- 4) Complete a minimum of 9 credit hours of thesis research (OPTI6991)
- 5) Present a Plan of Study detailing all course and examination requirements
- 6) Present a M.S. Research Plan
- 7) Successfully defend the M.S. thesis.

Admission to Candidacy

Students are admitted to candidacy upon completion of the Core Curriculum, appointment of a M.S. advisor, formation of an Advisory Committee, presentation of the Plan of Study, and approval of the Research Plan. These steps to candidacy must be completed within two years following admission to the program.

Core Curriculum

All graduates of the program must demonstrate competency in the Core Curriculum. Students may do so by completing the 5 Core Courses with a grade of B or better in each course. Well-prepared students may demonstrate competency in the Core Curriculum by earning a grade of pass on one or more of the five sections of a Core examination. In those cases, credit hours that would have been earned in the courses may be replaced by credit hours in OPTI 6991, Thesis Research, and/or other electives approved by the student's Advisory Committee and the Optics Program Director.

Thesis Advisor and Advisory Committee

Each student in the program must have a Thesis Advisor and an Advisory Committee before being admitted to candidacy. The student should select a thesis advisor before the end of the third semester of residency. The student and the thesis advisor jointly determine the advisory committee. The Thesis Advisor serves as Chair of the Advisory Committee and must be a member of the Optics Faculty at UNC Charlotte. The advisory committee must have at least 3 members, the majority of which must be members of the Optics Faculty. Composition of the Advisory Committee must be approved by the Optics Program Director.

Plan of Study

All students must prepare a Plan of Study before the end of the third semester following admission to the program. The Plan of Study should show in detail how the student will meet the 32 credit hour minimum. The Plan of Study must be approved by the Advisory Committee.

Research Plan

After successful completion of the Core Curriculum requirement and approval of the Plan of Study, the student will prepare a written Research Plan and an oral defense of that Plan presented in a public seminar. The Research Plan must be approved by the Advisory Committee. The Research Plan must demonstrate: (a) the student's knowledge of the relevant literature base, and (b) a research plan that, if successfully completed, will lead to an approved thesis.

Thesis

Each student will complete a minimum of 9 credit hours of thesis research. The student must present a written thesis to the Advisory Committee. The student must defend the thesis at a presentation before the Optics Faculty. Upon approval of the written thesis and oral presentation by the Advisory Committee, the student has successfully completed the thesis requirement. The thesis must be written using a format acceptable to the Graduate School.

Residency Requirement

The student must satisfy the residence requirement for the program by completing 12 credit hours of continuous enrollment in coursework/dissertation credit. Residence is considered continuous if the student is enrolled in one or more courses in successive semesters until 12 credit hours are earned.

Time Limit for Completion of Program Requirements

All program requirements must be completed within 6 calendar years from the date the student is admitted into the program.

Transfer Credit Accepted

Up to 6 credit hours of approved coursework may be transferred from other accredited master's and doctoral programs. Only courses in which the student earned a grade of B or better (or its equivalent) can be transferred. No more than 6 credit hours of approved coursework taken as a post-baccalaureate student may be applied toward the degree. Credit for thesis research cannot be transferred.

Assistantships

Support for beginning graduate students is usually a teaching assistantship. Continuing students are often supported by research assistantships.

Comprehensive Examination

The thesis defense is the final examination.

Language Requirement

The program has no language requirement.

COURSES IN OPTICAL SCIENCE AND ENGINEERING (OPTI)**M.S. Degree****CORE CURRICULUM**

OPTI 6101. Mathematical Methods of Optical Science and Engineering. (3). Topics include: matrix theory, series and Frobenius methods of solutions to ordinary differential equations, separation of variables techniques for partial differential equations, special functions, Fourier series, and transform methods. Topical coverage will emphasize applications specific to the field of optics. Three lecture hours per week. (*Fall*)

OPTI 6102. Principles of Geometrical and Physical Optics. (3) Ray analysis of common optical elements (mirrors, lenses and systems of lenses, prisms). Reflection and refraction at plane and spherical surfaces, thin and thick lenses, lensmaker's equation, field of view, and numerical aperture. Wave properties of light, superposition of waves, diffraction, interference, polarization, and coherence. Optics of thin films. Three lecture hours per week. (*Fall*)

OPTI 6104. Electromagnetic Waves. (3) Maxwell's equations, the electromagnetic wave equation, and electromagnetic wave functions. Waves in dielectric and conducting media, dispersion. Reflection, refraction, transmission, internal reflection, and evanescent waves at an interface. Intensity. Introduction to guided waves. Three lecture hours per week. (*Spring*)

OPTI 6105. Optical Properties of Materials. (3) Photophysical and photochemical processes in materials. Linear and nonlinear optical properties of materials. Optical properties of semiconductors and crystals. Optical transmission, absorption, and reflection. Fluorescence of organic and inorganic materials. Chiral molecular systems. Three lecture hours per week. (*Fall*)

OPTI 6211. Introduction to Modern Optics. (3) Fourier analysis and holography, Coherence. Introduction to light production and detection. Optical modulation, including EO effect, Kerr effect, amplitude modulation, magneto-optic effect, photoelastic effect, and acousto-optic effect. Introduction to nonlinear optics. Photonic switching. Three lecture hours per week. (*Spring*)

OPTI 6110. Seminar. (1) Prerequisite: Admission to Optics M.S. program. Topics include: discussion and analysis of topics of current interest in optics; effective techniques for making presentations and utilizing library materials; ethical issues in science and engineering. Attendance required. May be repeated for up to 4 hours credit. One semester of seminar is required of all students in the Optics M.S. program during each of their first two semesters of residence. After the first two semesters,

students are required to attend a minimum number of designated lectures. One to two hours per week.

(Fall/Spring)

THESIS RESEARCH

OPTI 6991. Thesis Research. (1-3) Prerequisite: Admission to candidacy. Research for the thesis. May be repeated for a total of 18 credit hours. Graded Pass/Fail. *(Fall/Spring/Summer)*

OPTI 7999. Master's Degree Graduate Residency Credit. (1) Prerequisite: OPTI 6991. Required of all Optics M.S. students who have completed all requirements for the degree except the thesis defense and are taking no other courses. May be repeated for credit. Credit for this course does not count toward the degree. *(Fall/Spring/Summer)*

M.S. OPTICS ELECTIVES

OPTI 6000. Selected Topics in Optics. (3). Prerequisite: Permission of Optics Program Director. Selected topics in optics from areas such as medical optics, adaptive optics, all optical networks, etc. May be repeated for up to 6 hours of credit with permission of the Optics Program Director. *(Fall/Spring/Summer)*

OPTI 6103. Light Sources and Detectors. (3) Prerequisite: OPTI 6211. The nature of light, blackbody radiation. Optical sources, including discharge lamps, light-emitting diodes, gas and solid state lasers. Quantum wells. Continuous wave and pulsed (mode-locked, Q-switched) lasers. Selected solid-state laser systems. Light detection, including thermal and quantum detectors, photomultiplier tubes, diode detectors. Noise in light sources and detectors. Three lecture hours per week. *(Fall, Odd years)*

OPTI 6201. Fourier Optics and Holography. (3) Prerequisites: OPTI 6102 and OPTI 6104. Principles of scalar, Fresnel, and Fraunhofer diffraction theory. Coherent optical data processing. Optical filtering and data processing. Holography. Three lecture hours per week. *(Fall, Even years)*

OPTI 6202. Fundamentals of Biomedical Optics. (3) Cross-listed as PHYS 6202. Basic principles underlying tissue optics, laser-tissue interactions, and optical imaging, microscopy, and spectroscopy for medical applications. *(Spring)*

OPTI 6205. Advanced Optical Materials. (3) Prerequisites: OPTI 6104 and OPTI 6105 or ECGR 6133/8133. Molecular optical materials including fabrication methods. Luminescence centers; quenching. Nonlinear optics, including higher order terms of the susceptibility tensor. Photonic crystals. Three lecture hours per week. *(Fall, Odd years)*

OPTI 6212. Integrated Photonics. (3) Prerequisites: OPTI 6102 and OPTI 6104. Theory and application of optical

waveguides, free-space micro-optics, and integrated photonic devices. Fabrication and integration techniques, including motivations for choice of approach (hybrid vs. monolithic, materials, size, performance, etc). Modeling and simulation. Students will be required to work with mathematical packages such as Matlab and/or Mathematica to illustrate key concepts and to implement beam propagation/optical modeling simulations. Three lecture hours per week. *(Spring, Odd years)*

OPTI 6221. Optical Communications. (3) Prerequisites: OPTI 6102 and OPTI 6103. Introduction to optical communications and basic communication block such as lasers, optical modulators, and optical transceivers. Review of fibers (attenuation, dispersions, etc.). Optical amplifiers. Passive and active photonic components such as tunable lasers and filters. Coherent and incoherent detection. Signal processing, photonic switching, and point-to-point links / connections. Three lecture hours per week. *(Spring)*

OPTI 6222. Optical Communication Networks. (3) Prerequisite: OPTI 6221 or graduate standing in ECE, CS, or IT. Optical signal coding, multiplexing and demultiplexing. Time-domain medium access (TDM (SONET) and TDMA), wavelength-division multiplexing (WDM and WDMA). Optical networks, add-drop multiplexing (OADM), switching and routing technologies, Dispersion management. Optical clock and timing recovery. Optical amplification, wavelength conversion, transport, and networking protocols. Broadband ISDN concepts. Access, metro, and long-haul network topologies. Three lecture hours per week. *(Fall)*

OPTI 6241. Optical System Function and Design. (3) Prerequisite: OPTI 6102. Advanced study of telescopes, microscopes, cameras, off-axis imaging systems, stops, apertures, multiple lenses, use and selection of ray trace computer codes. Three lecture hours per week. *(Spring, Even years)*

OPTI 6242. Optical Propagation in Inhomogeneous Media. (3) Prerequisites: OPTI 6102 and OPTI 6104. Advanced study of free space propagation, scattering, and scintillation of Gaussian and uniform beam waves. Random processes, weak fluctuation theory, propagation through complex paraxial optical systems *(Spring, Odd years)*

OPTI 6244. High Speed Photonics and Optical Instrumentation. (3) Prerequisites: OPTI 6103 and OPTI 6104. Study of instrumentation used for generation, detection, and manipulation of light in optical circuits. Topics include ultrashort pulse generation, photon-phonon interactions, 2nd & 3rd harmonic generation, squeezed light, optical tweezers, OPO, electro-optic modulators, selective polarizers, optical switches, amplifiers, multiplexing and mixing schemes, and application of CCD and CMOS cameras and detectors. Three lecture hours per week. *(Spring, Odd years)*

OPTI 6261. Modern Coherence Theory. (3) Prerequisites: OPTI 6102 and OPTI 6104. Stochastic processes. Second order coherence of scalar and vector wavefields, radiation and states of coherence. Quantum wavefields. (*Fall, Odd years*)

OPTI 6271. Advanced Physical Optics (3) Prerequisites: OPTI 6101, OPTI 6102, and OPTI 6104. Advanced study of electromagnetic wave propagation, stratified media, physics of geometrical optics, polarization and crystal optics, absorption and dispersion, interference, propagation and diffraction. Three lecture hours per week. (*Spring, Odd years*)

OPTI 6281. Modern Optics Laboratory. (3) Prerequisite: OPTI 6102. Selected experiments in areas of modern optics such as fiber optics, interferometry, spectroscopy, polarization, optical metrology, and holography. Six laboratory hours per week. (*Spring*)

OPTI 6691. Research Seminar. (1 - 3) Prerequisite: Permission of the Optics Program Director. A seminar in which independent study may be pursued by the student, or a group of students, under the direction of a professor. May be repeated for up to a maximum of 6 credit hours. (*Fall/Spring/Summer*)

Ph.D. Degree

CORE CURRICULUM

OPTI 8101. Mathematical Methods of Optical Science and Engineering. (3) See OPTI 6101 for Course Description.

OPTI 8102. Principles of Geometrical and Physical Optics. (3) See OPTI 6102 for Course Description.

OPTI 8104. Electromagnetic Waves. (3) See OPTI 6104 for Course Description.

OPTI 8105. Optical Properties of Materials. (3) See OPTI 6105 for Course Description.

OPTI 8202. Fundamentals of Biomedical Optics. (3) See OPTI 6202 for Course Description.

OPTI 8211. Introduction to Modern Optics. (3) See OPTI 6211 for Course Description.

OPTI 8110. Seminar. (1) Prerequisite: Admission to Optics Ph.D. program. Topics include: discussion and analysis of topics of current interest in optics; effective techniques for making presentations and utilizing library materials; ethical issues in science and engineering. Attendance required. May be repeated for up to 6 hours credit. One semester of seminar is required of all students in the Optics Ph.D. program during each of their first two semesters of residence. After the first two semesters,

students are required to attend a minimum number of designated lectures. One to two hours per week. (*Fall/Spring*)

PH.D. DISSERTATION

OPTI 8991. Dissertation Research. (1–3) Prerequisite: Admission to candidacy. Research for the dissertation. May be repeated for a total of 54 credit hours. Graded Pass/Fail. (*Fall/Spring/Summer*)

OPTI 9999. Doctoral Degree Graduate Residency Credit. (1) Prerequisite: OPTI 8991. Required of all Optics Ph.D. students who have completed all requirements for the degree except the dissertation defense and are taking no other courses. May be repeated for credit. Credit for this course does not count toward the degree. (*Fall/Spring/Summer*)

PH.D. OPTICS ELECTIVES

OPTI 8000. Selected Topics in Optics. (3) Prerequisite: Permission of Optics Program Director. See OPTI 6000 for Course Description.

OPTI 8103. Light Sources and Detectors. (3) Prerequisite: OPTI 8211. See OPTI 6103 for Course Description.

OPTI 8201. Fourier Optics and Holography. (3) Prerequisites: OPTI 8102 and OPTI 8104. See OPTI 6201 for Course Description.

OPTI 8205. Advanced Optical Materials. (3) Prerequisites: OPTI 8104 and OPTI 8105 or ECGR 6133/8133. See OPTI 6205 for Course Description.

OPTI 8212. Integrated Photonics. (3) Prerequisites: OPTI 8102 and OPTI 8104. See OPTI 6212 for Course Description.

OPTI 8221. Optical Communications. (3) Prerequisites: OPTI 8102 and OPTI 8103. See OPTI 6221 for Course Description.

OPTI 8222. Optical Communication Networks. (3) Prerequisite: OPTI 8221. See OPTI 6222 for Course Description.

OPTI 8241. Optical System Function and Design. (3) Prerequisite: OPTI 8102. See OPTI 6241 for Course Description.

OPTI 8242. Optical Propagation in Inhomogeneous Media. (3) Prerequisites: OPTI 8102 and OPTI 8104. See OPTI 6242 for Course Description.

OPTI 8244. High Speed Photonics and Optical Instrumentation. (3) Prerequisites: OPTI 8103 and OPTI 8104. See OPTI 6244 for Course Description.

OPTI 8261. Modern Coherence Theory. (3) Prerequisites: OPTI 8102 and OPTI 8104. See OPTI 6261 for Course Description.

OPTI 8271. Advanced Physical Optics (3) Prerequisites: OPTI 8101, OPTI 8102, and OPTI 8104. See OPTI 6271 for Course Description.

OPTI 8281. Modern Optics Laboratory. (3) Prerequisite: OPTI 8102. See OPTI 6281 for Course Description.

OPTI 8691. Research Seminar. (1 - 3) Prerequisite: Permission of Optics Program Director. See OPTI 6691 for Course Description.

Organizational Science

- **Ph.D. in Organizational Science**

Organizational Science Program

<http://orgscience.uncc.edu/>

Director

Dr. Steven Rogelberg
Department of Psychology

PH.D. IN ORGANIZATIONAL SCIENCE

Organizational Science is an emerging interdisciplinary field of inquiry focusing on employee and organizational health, well-being, and effectiveness. Organizational Science is both a science and a practice, enhanced understanding leads to applications and interventions that benefit the individual, work groups, the organization, the customer, the community, and the larger society in which the organization operates. Specific topics of study in Organizational Science include, but are not limited to: *Team Processes and Performance; Organizational Structure and Effectiveness; Selection, Testing, and Promotion; Leadership; Organizational Culture and Climate; Training and Development; Performance Evaluation; Workplace Health and Safety; Workplace Diversity; Employee Attitudes; Job Satisfaction and Turnover; Rewards and Recognition; Communication Effectiveness; Technology and Work; Employee Motivation and Participation; Employee Citizenship and Deviance; Work-Life Programs; Organizations and External Environment; Customer Service and Satisfaction; Organizational Behavior; Employee Recruitment and Socialization; Interorganizational Relations; and Organizational Change.* The discipline stems from (in alphabetical order): Industrial/Organizational Psychology, Human Resources Management,

Organizational Behavior, Organizational Communication, Organizational Sociology and Social Psychology.

Upon graduation, students will have achieved the following educational objectives:

- Acquire a comprehensive and integrated body of organizational science knowledge ranging from micro issues concerning employee selection and socialization to more macro issues concerning organizational structure and effectiveness.
- Demonstrate competence in synthesizing and transcending disciplinary perspectives to generate novel, useful, and robust understandings of organizational science phenomena.
- Demonstrate competence in planning, conducting, and evaluating Organizational Science research.
- Demonstrate competence in teaching, communicating, and disseminating organizational science knowledge to others in an effective and pedagogically appropriate manner.
- Demonstrate competence in collaborating with a diverse group of professionals, students, research participants, and consumers of organizational science services.
- Demonstrate competence in applying research in organizational science to practice leading to applications and interventions that benefit the individual, the organization, the customer, and the larger community in which the organization operates.

By meeting these objectives, graduates of the program will be prepared to assume leadership roles as organizational scholars, researchers, and educators in academic institutions and as practitioners and policy makers in a wide range of public and private settings. By doing so, our graduating doctoral students will be further promoting our core mission to advance employee and organizational health, well-being, and effectiveness.

Admission Requirements

In addition to the general requirements for admission to the Graduate School, we ask students to submit the following:

- 1) Official report of score on the GRE and/or GMAT.
- 2) A one to two-page professional statement (discuss interest in the program and objectives for pursuing this degree).
- 3) A current resume or vita.
- 4) International students (whose native language is not English) must submit official test scores on the Test of English as a Foreign Language (TOEFL) of at least 550 on the written test or 220 on the computer-based test or a score of at least 85% on the Michigan English Language Assessment Battery (MELAB). All tests must have been taken within the past two years.

The following are recommended admissions requirements:

- 1) Combined score of at least 1100 on the verbal and quantitative portions of the GRE and a satisfactory score on the analytical section of the GRE.
Alternatively (or in addition) it is recommended that GMAT scores exceed 600.
- 2) Undergraduate Grade Point Average of 3.0 or higher.
- 3) Completion of statistics and research methodology courses.
- 4) Research experience.

Degree Requirements and Notes

Outlined below are the requirements of the Organizational Science Ph.D. program. Additional detail on all can be found in the *Organizational Science Graduate Handbook*.

- 1) 77 hours (post baccalaureate) will be required.
- 2) Graduate students must have a 3.0 GPA in the courses on their degree plan of study in order to graduate. More than two grades of C or one U will result in termination from the program.
- 3) Students who have taken graduate coursework but have not earned graduate degrees may transfer in up to six semester hours of coursework. Students who have earned master's degrees may transfer up to thirty semester hours.
- 4) Beyond the 30 hours that students with a Master's degree can transfer into the program, all coursework that will count toward the Ph.D. will be 6000-level or above. The majority of the coursework will be at the 8000 level.
- 5) Master's thesis or Independent Pre-Doctoral Research Project is required.
- 6) A qualifying exam is required. Failure to pass the qualifying examination after two attempts will result in termination from the Graduate Program.
- 7) A Dissertation is required.
- 8) An organizational science practicum is optional.
- 9) Each year, a student will have a performance appraisal assessment.
- 10) A student may choose a disciplinary "emphasis" (e.g., an emphasis in Business, Sociology, Psychology, or Communication Studies). An emphasis includes three discipline-specific courses. A disciplinary emphasis would provide an opportunity for a student to combine interdisciplinary training with a core disciplinary specialization. Students preparing for careers in academia may benefit most from having such an emphasis. Students may choose to not have an "emphasis" and instead take electives that span across all disciplines. Program director approval is needed in order to count a course toward an emphasis.
- 11) A student can consider co-enrolling in other MA programs at UNC Charlotte.
- 12) Students must complete their degree, including dissertation, within eight years.

Curriculum

The curriculum has 2 major curricular components: (1) Core Organizational Science and Research and (2) Electives/Advanced Seminars.

Core Organizational Science and Research (53 Credits)

- OSCI 8000 Organizational Science Overview (3)
 OSCI 8001 Current Topics and Events in Organizational Science (1, 7 required) [Note: if OS overview does not include a lab, 8 credits will be required.]
 OSCI 8100 Organizational Science Lab (1-2)
 OSCI 8103 Research Design and Quantitative Methods II (3)
 OSCI 8205 Field and Lab Based Quantitative Research Methods (3)
 OSCI 8206 Qualitative Research Methods (3)
 OSCI 8208 Advanced Qualitative Data Analysis (3)
 OSCI 8610 Micro Organizational Science I (3)
 OSCI 8611 Macro Organizational Science I (3)
 OSCI 8620 Micro Organizational Science II (3)
 OSCI 8621 Macro Organizational Science II (3)
 OSCI 8948 Independent Pre-Doct Org Science Research Project I (3)
 OSCI 8949 Independent Pre-Doct Org Science Research Project II (3)
 OSCI 8998 Organizational Science Dissertation I (3)
 OSCI 8999 Organizational Science Dissertation II (3)

Electives (24 Credits)

Each student will choose 24 credit hours from the following core of electives:

- OSCI 8002 Ethics and Professional Issues in Organizational Science (2)
 OSCI 8003 Writing & Publishing in Organizational Science (1 or 2)
 OSCI 8130 Social Psychology (3)
 OSCI 8207 Psychometrics (3)
 OSCI 8630 Micro Seminar in Organizational Science (3, repeated up to 3 times)
 OSCI 8640 Macro Seminar in Organizational Science (3, repeated up to 3 times)
 OSCI 8650 Research Methods Seminar in Organizational Science (3, repeated up to 3 times)

Other Options

- OSCI 8899 Organizational Science Readings and Research (1-3, maximum of 6 cr. can count for this elective unless approved by the Director. However, there is no limit on the amount of readings and research credits a student can take)
 Content (e.g., strategy, decision making) or methods courses (multivariate, social networking, categorical methods, SEM, longitudinal) outside of OS that have approval of the program director can also serve as electives. These "outside" courses will typically originate from the Departments of Psychology, Sociology, Communication Studies and the College of Business. They must be at the 6000 or 8000 level.

COURSES IN ORGANIZATIONAL SCIENCE

OSCI 8000. Organizational Science Overview. (3) Cross-listed as PSYC 6000. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Provides broad overview of the field of Organizational Science including its historical foundations. Each week is a mini-seminar on a particular topic within the field. *(Fall)*

OSCI 8001. Current Topics and Events in Organizational Science. (1) Cross-listed as PSYC 6001. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. New and innovative research and practice topics related to Organizational Science will be discussed / delivered / facilitated by student researchers, faculty and invited speakers. These “cutting edge” topics will span all of micro and macro organizational science and will change each semester. Pass/Unsatisfactory grading. May be repeated for credit. *(Fall, Spring)*

OSCI 8002. Ethics and Professional Issues in Organizational Science. (2) Cross-listed as PSYC 6002. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Discusses ethical standards in professional practice, testing, research; business ethics; expectations and problems confronting organizational science practitioners in industrial and professional organizations. *(Fall)*

OSCI 8003. Writing & Publishing in Organizational Science. (1 or 2) Cross-listed as PSYC 6003. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Seminar to enhance effective technical/scientific writing (e.g., learning APA style, presentation of statistical analyses) and understanding the publication process (e.g., selecting an appropriate outlet, preparing a manuscript, the review process). Students will actively engage in writing as well as the review process (as both a reviewer and author). *(Fall)*

OSCI 8100. Organizational Science Lab. (1-2) Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor and co-enrollment in OSCI 8000. Special topics seminar connected with the Organizational Science Overview course (typically taught by the same instructor). Topics cover the field of Organizational Science. Science/practice/research issues emphasized. The instructor determines whether the class is taken for a letter grade or Pass/Unsatisfactory. *(Fall)*

OSCI 8102. Research Design and Quantitative Methods I. (3) Cross-listed as PSYC 8102. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. An overview of basic experimental and covariation research designs and the application of descriptive and inferential statistics to the

designs. The focus will be on univariate designs, including simple and complex group comparisons, and basic correlational and linear regression strategies. *(Fall)*

OSCI 8103. Research Design and Quantitative Methods II. (3) Cross-listed as PSYC 8103. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. An introduction to advanced experimental and covariation research strategies. The focus will be on a thorough exploration of applied multiple regression analysis. A brief introduction to selected multivariate models such as discriminant analysis, multivariate analysis of variance, log-linear models, factor analysis, and structural equation modeling will also be provided. *(Spring)*

OSCI 8130. Social Psychology. (3) Cross-listed as PSYC 6130. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Human social behavior; topics include affiliation, person perception, conformity and attitudes. *(Yearly)*

OSCI 8205. Field and Lab Based Quantitative Research Methods. (3) Cross-listed as PSYC 6205. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Examines quantitative approaches to Organizational Science research such as experimental designs, quasi-experimental designs, organizational surveys, longitudinal models and field research. *(Yearly)*

OSCI 8206. Qualitative Research Methods. (3) Cross-listed as PSYC 6206. Prerequisites: Full graduate standing in the Ph.D. program in Organizational Science or permission of the instructor. Examines qualitative approaches to Organizational Science research such as focus groups, verbal protocol, interviewing, naturalistic observation, and content analysis. *(Yearly)*

OSCI 8207. Psychometrics. (3) Cross-listed as PSYC 6207. Prerequisite: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Presents an introduction to classical and modern test theory and methods. Theoretical and statistical bases for the measurement of psychological constructs are covered including Classical True Score Theory, reliability and validity inferences, item response theory, scaling, and an introduction to factor analysis. *(Yearly)*

OSCI 8208. Advanced Qualitative Data Analysis. (3) Prerequisite: OSCI 8206 or permission of the instructor. This course extends the foundational approaches presented in OSCI 8206 to provide advanced instruction on the assumptions, contingencies, techniques, and practices of computer-supported qualitative data analysis systems (CAQDAS). Students will work with several advanced software packages that facilitate the management, analysis, and display of qualitative data. *(Yearly)*

OSCI 8477. Organizational Science Practicum. (1-6)
Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Practical experience/Internship in an organizational setting. With permission from the program director, a research assistantship on a grant can fulfill this requirement. Pass/Unsatisfactory grading. May be repeated for credit. (*Fall, Spring, Summer*)

OSCI 8610. Micro Organizational Science I. (3) Cross-listed as PSYC 6610. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Examines research, theory and application regarding individual differences (e.g., abilities, personality), assessment (e.g., tests, inventories, interviews, assessment centers), criterion development (e.g., job analysis, performance models) and organizational staffing processes (i.e., recruitment, selection, basic legal concepts). (*Yearly*)

OSCI 8611. Macro Organizational Science I (3) Cross-listed as PSYC 6611. Prerequisite: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Examines research, theory and application on the following topics: motivation, communication systems and processes, stress, job design, leadership, employee attitudes and emotions, teamwork, and decision making. (*Yearly*)

OSCI 8620. Micro Organizational Science II. (3) Cross-listed as PSYC 6620. Prerequisite: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Examines research, theory and application regarding post-entry personnel issues such as training, performance management, performance appraisal, compensation, and employee socialization. (*Yearly*)

OSCI 8621. Macro Organizational Science II. (3) Cross-listed as PSYC 6621. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Examines research, theory and application on the following topics: organizational development, organizational change, organizational climate, organizational culture, organizational theory, and relations between organizations and their environment. (*Yearly*)

OSCI 8630. Micro Seminar in Organizational Science. (3) Cross-listed as PSYC 6630. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Examination of special topic(s) germane to Micro Organizational Science. The seminar may focus on one or a small number of topics salient to this area. Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit for different topics. May be repeated for credit. (*On demand*)

OSCI 8640. Macro Seminar in Organizational Science. (3) Cross-listed as PSYC 6640. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Examination of special

topic(s) germane to Macro Organizational Science. The seminar may focus on one or a small number of topics salient to this area. Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit for different topics. May be repeated for credit. (*On demand*)

OSCI 8650. Research Methods Seminar in Organizational Science. (3) Cross-listed as PSYC 6650. Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Examination of special topic(s) germane to research methods in Organizational Science. The seminar may focus on one or a small number of topics that define this area (e.g., a data analytic technique, a methodological approach). Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit. (*On demand*)

OSCI 8899. Organizational Science Readings and Research. (1-3) Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Research and/or reading on a topic agreed on by a student and a faculty member. Pass/unsatisfactory grading. May be repeated for credit. (*Fall, Spring, Summer*)

OSCI 8948. Independent Pre-Doctoral Organizational Science Research Project I. (3) Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Identification of a focused research question and development of a research proposal comparable in scope to a Master's thesis. Conducted under the direction of a research chair and committee. Pass/Unsatisfactory grading. May be repeated for credit. (*Fall, Spring, Summer*)

OSCI 8949. Independent Pre-Doctoral Organizational Science Research Project II. (3) Prerequisites: OSCI 8948 and Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Research and defense of on an Independent Pre-Doctoral Research Project conducted under the direction of a research chair and committee. Pass/unsatisfactory grading. May be repeated for credit. (*Fall, Spring, Summer*)

OSCI 8998. Organizational Science Dissertation I. (3) Prerequisites: Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Identification of a research question and development of the proposal for a research study appropriate a dissertation project. Conducted under the direction of a research chair and committee. Pass/unsatisfactory grading. May be repeated for credit. (*Fall, Spring, Summer*)

OSCI 8999. Organizational Science Dissertation II. (3) Prerequisites: OSCI 8998 and Full graduate standing in the Organizational Science Ph.D. program or permission of the instructor. Research and defense of on an Independent Dissertation Project conducted under the direction of a research chair and committee. Pass/unsatisfactory grading. May be repeated for credit. (*Fall, Spring, Summer*)

OSCI 9999. Doctoral Degree Graduate Residency Credit.
(Fall, Spring, Summer)

Philosophy

See *Ethics and Applied Philosophy*

Physics

• M.S. in Applied Physics

Department of Physics and Optical Science

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Coordinator

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MASTER OF SCIENCE IN APPLIED PHYSICS

The Applied Physics degree program is excellent preparation for those planning to continue their education through the Ph.D., either in physics or an engineering field, or for a career as an instructor in a two-year college. Students

electing the Thesis Option will be well qualified for employment in industry or in a research laboratory.

While students have opportunities for research in optics, astronomy, plasma physics, and nuclear magnetic resonance, the research emphasis in the Department is in the area of applied optics. The Department of Physics and Optical Science is a major participant, and the administrative coordinator, of M.S. and Ph.D. programs in Optical Science and Engineering. These degree programs are interdisciplinary involving six science and engineering departments [Physics & Optical Science, Chemistry, Mathematics, Electrical & Computer Engineering, Mechanical Engineering & Engineering Science, and Computer Science], the Center for Optoelectronics & Optical Communications, and the Center for Precision Metrology. The program emphasizes basic and applied interdisciplinary education and research in areas of optics that include:

- Optoelectronic devices and sub-assemblies
- Devices for telecommunications, sensors, and characterization
- Optical materials (semiconductors, polymer-organic and crystalline)
- Optical metrology
- Optical imaging
- Optical communication networks

A complete description of the programs and course offerings in Optical Science and Engineering can be accessed at the web address <http://optics.uncc.edu> and under the OPTI listing in the Graduate Catalog.

Degree Requirements

The Department of Physics and Optical Science has three concentrations within the M.S. in Applied Physics program that include both thesis and non-thesis degree options:

- 14) Applied Physics Concentration (Thesis or non-thesis option)
- 15) Applied Optics Concentration (Thesis option only)
- 16) Medical Physics Concentration (Non-thesis option only)

All degree options require the completion of 30 credit hours approved by the Physics and Optical Science Department. A minimum of 15 credit hours presented for the degree must be in courses numbered 6000 and above. Courses for which undergraduate credit has been awarded may not be repeated for graduate credit. A minimum grade point average of 3.0 is required on all coursework attempted for the degree. At the time of admission up to 6 semester hours of graduate transfer credit may be accepted if approved by the Department of Physics and Optical Science and the Graduate School. All candidates for the degree must pass a final examination administered by the student's Advisory Committee.

A student selecting the thesis option must present credit for at least 6 semester hours of PHYS 6991. The thesis defense

is the final examination for a student selecting the thesis option.

A student selecting the non-thesis option must pass a final examination administered by the student's Advisory Committee. Example questions relating to subject matter for the examination will be prepared by the Advisory Committee and given to the student at least 30 days prior to the examination date. The student will prepare responses to these questions and make an oral presentation to members of the Committee that is based upon the prepared responses. Committee members may question the student on any and all aspects of the relevant test material.

A student selecting the Medical Physics concentration should do so prior to enrolling. The Medical Physics concentration is designed for students wishing to pursue careers in such medical fields as radiology or medical imaging or as a research scientist/technician with companies developing and manufacturing medical equipment.

The medical physics concentration is designed to accept students having undergraduate majors in physics, chemistry, and engineering. Applicants for admission to the Medical Physics concentration must, as a minimum, present earned credit for the equivalent of the UNC Charlotte courses listed below.

PHYS 2101 and PHYS 2101L Physics for Science & Engineering I and Lab (4)
 PHYS 2102 and PHYS 2102L Physics for Science & Engineering II and Lab (4)
 PHYS 3101 Topics & Methods of General Physics (3)
 PHYS 3141 Introduction to Modern Physics (3)
 MATH 1241, 1242, 2241, 2242, and 2171 (15)
 CHEM 1251, 1251L, 1252, 1252L - Principles of Chemistry and Labs (8)

Students lacking courses in anatomy and physiology will be required to take BIOL 1273 and 1273 Laboratory - Human Anatomy and Physiology - 4 credit hours. Students lacking courses in basic circuit theory and electronics will be required to take ECGR 2161 - Basic Electrical Engineering I - 3 credit hours.

A candidate for the degree must present credit for the following courses.

PHYS 6210 Theoretical Physics
 PHYS 5232 Electromagnetic Theory II
 PHYS 5242 Modern Physics II
 PHYS 6261 Nuclear Physics
 PHYS 6301 Radiation Detection, Instrumentation, & Data Analysis
 PHYS 6302 Radiation Protection and Dosimetry
 PHYS 6303 Imaging in Medicine
 PHYS 6304 Physics of Diagnostic Radiology & Radiotherapy
 PHYS 6401 Clinical Medical Physics (6 credit hours)

Entering students not having the equivalent of PHYS 4222, PHYS 4232, or PHYS 4242 are required to take PHYS 5222, PHYS 5232, and/or PHYS 5242, as appropriate, before the end of their first year of residence. A student may, with departmental approval, apply up to 9 semester hours from such related areas as Optics, Mathematics, Chemistry, and Engineering toward the 30 credit hour degree requirement.

Additional Admission Requirements

In addition to fulfilling the university's general requirements for graduate admission at the Master's level, applicants seeking admission into the M.S. in Applied Physics program must also:

- 1) Possess a Bachelor's degree in Physics, or a closely allied field, from an accredited college or university. Applicants from fields other than Physics may expect to be required to remove deficiencies in their physics background.
- 2) Present satisfactory scores on the aptitude portion of the Graduate Record Examination.
- 3) Possess an overall grade point average of at least 2.75 (based on a 4.0 scale) on all of the applicant's previous work beyond high school. The average in the major should be 3.0 or better.
- 4) Present satisfactory scores on the Test of English as a Foreign Language, if the applicant is from a non-English speaking country.
- 5) Demonstrate evidence of sufficient interest, ability, and preparation in physics to adequately profit from graduate study, as determined by the Physics Department's Graduate Committee.

Admission to Candidacy

In addition to the general requirements for admission to candidacy, students enrolled in the Master of Science program in Applied Physics should have:

- 1) Removed all identified entrance deficiencies by the time of application for admission to candidacy
- 2) Completed at least 18 approved credit hours with a GPA of 3.0 or better
- 3) Selected a major advisor and formed an advisory committee

Assistantships

Support for beginning graduate students is usually a teaching assistantship. Continuing students are often supported by research assistantships.

Comprehensive Examination

All candidates for the degree must pass a final examination. The thesis defense is the final examination for those students who select the thesis option.

A student selecting the non-thesis option must pass a final examination administered by the student's Advisory Committee. Subject matter for the examination will be

prepared by the student's Advisory Committee and given to the student at least 30 days prior to the examination date. The student will make an oral presentation to members of the Committee that is based upon the prepared response. Committee members may question the student on any and all aspects of the relevant test material.

Advisory Committee

Each student in the M.S. in Applied Physics Program must have a major advisor and an advisory committee. The student should select a major advisor before the end of the first year of residency. The student and the major advisor jointly determine the advisory committee. The advisory committee must have at least 3 members, the majority of which must be from the Department of Physics and Optical Science. The major advisor and the advisory committee must be in place prior to applying for degree candidacy.

COURSES IN PHYSICS

Any physics course at the 5000 or 6000 level can be applied to the 30-hour requirement. Any other courses to be applied toward the 30-hour-course requirement must be approved, in advance, by the Physics Department. Courses approved by the Physics Department as appropriate for meeting the 30-hour-degree requirement are listed below. A minimum of 15 credit hours must be in courses with a 6000 number.

PHYS 5000. Selected Topics in Physics. (0-4) Prerequisite: Permission of instructor. Selected advanced topics in physics. May be repeated with approval of the Department. *(On demand)*

PHYS 5220. Computational Methods in Physics. (3) Prerequisite: Permission of instructor. Use of computers in solving physics problems including computational and mathematical methods to solve problems in classical mechanics, quantum mechanics, electromagnetism, nuclear physics, optics, and solid state physics. Computer solutions include numerical methods of integration, solving differential equations, curve fitting, and statistical analysis in physics. *(On demand)*

PHYS 5222. Classical Mechanics II. (3) Prerequisite: PHYS 3121 and MATH 2241. Continuation of PHYS 3121. The second course of a two-semester sequence treating particle dynamics, the motion of systems of particles, rigid body motion, moving coordinate systems, Lagrange's equations, Hamilton's equations, and small oscillations. Three lecture hours a week. *(Spring)*

PHYS 5231. Electromagnetic Theory I. (3) Prerequisites: For physics majors, PHYS 3121 with a grade of C or better; Others: permission of instructor; MATH 2171, MATH 2241. Corequisite: MATH 2242. The first course of a two-semester sequence. Topics considered include electrostatics and magnetostatics in free space and in matter, the motion of charged particles in electric and magnetic fields, capacitance, dielectric theory, field energy, electromagnetic induction and inductance, vector and scalar potentials,

magnetic properties of matter. Maxwell's equations, solutions of Maxwell's equations in free space and in matter, propagating electromagnetic waves, and boundary value problems. *(Spring)*

PHYS 5232. Electromagnetic Theory II. (3) Prerequisite: PHYS 4231. Continuation of PHYS 4231. The second course in a two-semester sequence. Topics include magnetostatics in free space and in matter, electromagnetic induction, vector and scalar potentials, magnetic properties of materials, Maxwell's equations in free space and in matter, propagating electromagnetic waves, and boundary value problems. Three lecture hours a week. *(Fall)*

PHYS 5242. Modern Physics II. (3) Prerequisite: PHYS 4241. An extension of PHYS 4241 to include more advanced topics such as generalized eigenvalue problems, angular momentum, spin, the hydrogen atom, and perturbation theory, with selected applications from atomic, solid state, and nuclear physics. Three lecture hours a week. *(Spring)*

PHYS 5271. Principles of Geometrical and Physical Optics. (3) Prerequisites: PHYS 2102 with a grade of C or better, senior standing, and MATH 2171. Exceptions by permission of the instructor. Topics include the mathematics of wave motion, light as an example of an electromagnetic wave, the superposition of periodic and non-periodic waves, and selected topics from geometrical and physical optics. *(Fall)*

PHYS 5350. Teaching and Learning Physics. (3) Prerequisites: PHYS 2102 or permission of instructor. A course on how people learn and understand key ideas related to physics. Course focus includes physics content, pedagogical methods and curriculum, cognitive science, and physics education research. Course includes opportunities for teaching and individualized projects. *(On demand)*

PHYS 6101. Biophysics. (3) Prerequisite: Permission of instructor. Will include principles of physics relevant to biological media; electrical activity, optical microscopy, and spectrophotometry. Photosynthesis and light absorption. Models of blood flow and the cardiovascular system. Dynamics of membrane lipids and ionic flow. Visual and audio systems. Radiation biophysics, ultrasonic interaction in biological media. Credit cannot be awarded for both PHYS 6101 and 8101. *(Fall)*

PHYS 6121. Classical Dynamics. (3) Prerequisite: PHYS 4222. Variational principles and Lagrange's equations. Hamilton's principles and mechanics of particles. The two-body central force problem. Rigid body motion. Small oscillations and the eigenvalue equation. *(Spring, alternate years)*

PHYS 6131. Classical Electromagnetism I. (3) Prerequisite: PHYS 4232. Electrostatic and boundary value problems. Multipole expansions, dielectrics and magnetostatics. Maxwell's equations, time varying fields and

conservation laws. Plane electromagnetic waves and wave propagation. Wave guides and resonant cavities. Simple radiating systems. Scattering and diffraction theory. (*Fall, alternate years*)

PHYS 6132. Classical Electromagnetism II. (3)

Prerequisite: PHYS 6131. Special theory of relativity. Dynamics of relativistic particles and electromagnetic fields. Charged particle collisions and scattering. Radiation by moving charges. Bremsstrahlung, virtual quanta, and beta decay theory. Multipole expansions and fields. Radiation damping. Self-fields of particles. Scattering and absorption of radiation by a bound system. (*On demand*)

PHYS 6141. Quantum Theory I. (3) Prerequisite: PHYS 4242. Principles of non-relativistic wave mechanics. The Schrodinger equation, linear harmonic oscillator and WKB approximation. Central forces and angular momentum. The hydrogen atom. (*Fall, alternate years*)

PHYS 6142. Quantum Theory II. (3) Prerequisite: PHYS 6141. Scattering theory, linear vector spaces, spin, two level systems. Quantum dynamics, symmetry operations, bound state and time-dependent perturbation theory. Theory of scattering, angular momentum, and identical particles. (*On demand*)

PHYS 6201. Fourier Optics. (3) Prerequisite: PHYS 4271 or permission of instructor. Principles of scalar, Fresnel, and Fraunhofer diffraction theory. Coherent optical imaging systems, optical filtering, optical data processing, and holography. Application of Fourier optics and holography. (*Fall, Even years*)

PHYS 6202. Fundamentals of Biomedical Optics. (3) Cross-listed as OPTI 6202. Basic principles underlying tissue optics, laser-tissue interactions, and optical imaging, microscopy, and spectroscopy for medical applications. (*Spring*)

PHYS 6203. Methods of Molecular Modeling and Simulation in Physics. (3) Prerequisite: Permission of the instructor. Numerical methods. Atomic models of soft-matter systems: liquids, polymers, and biomolecules. Molecular dynamics and Monte Carlo methods. Inter-particle potentials. Methods of efficient conformational sampling. Free energy calculations. Introduction to fundamental methods of molecular simulations designed to characterize and predict properties of microscopic systems in materials, physics, and biology. Classical simulations and their connection to experimentally measurable properties. (*Spring, On demand*)

PHYS 6210. Theoretical Physics. (3) Prerequisite: Permission of department. Topics include: Matrices, power series, solutions to ordinary and partial differential equations, Hilbert space, Fourier integrals, boundary value problems, Green's functions, and complex analysis. (*Fall*)

PHYS 6211. Introduction to Modern Optics. (3)

Prerequisite: PHYS 4271 or permission of department. Theory of laser oscillation, optical resonators, interaction of radiation and atomic systems, giant pulsed lasers, laser systems. Wave propagation in non-linear media, modulation of optical radiation, noise in optical detection and generation. Interaction of light and sound. Laser types and applications including the free-electron laser. (*Spring*)

PHYS 6220. Computational Methods in Physics. (3)

Prerequisite: PHYS 5210. Use of computers in solving physics problems including computational and mathematical methods to solve problems in classical mechanics, quantum mechanics, electromagnetism, nuclear physics, optics, and solid state physics. Computer solutions include numerical methods of integration, solving differential equations, curve fitting, and statistical analysis in physics. (*On demand*)

PHYS 6221 Optical Communications I. (3) Prerequisite:

Prerequisites: PHYS 4242, 6241, or ECGR 5165. Introduction to optical communications. Optical waveguides (attenuation, dispersions, etc.). Basic communication blocks such as lasers, optical modulators, and optical transceivers. Passive and active photonic components such as tunable lasers, optical amplifiers, SOAs, l-converter, and filters. Coherent and incoherent detection. Signal processing, photonic switching, and point-to-point connections. Three lecture hours per week. (*Spring*)

PHYS 6241. Light Sources and Detectors. (3) Prerequisite:

PHYS 4241 or permission of department. Wave nature of light, basic semiconductor properties, light sources, light detectors and modulators, optical waveguides, optical systems with applications, and selected topics in non-linear optics. (*Fall, Odd years*)

PHYS 6251. Statistical Physics. (3) Prerequisite:

Permission of instructor. Classical and quantum statistical mechanics. Statistical thermodynamics. Ensembles, partition functions, fluctuations, ideal Fermi and Bose gas systems. (*On demand*)

PHYS 6261. Nuclear Physics. (3) Prerequisite: Permission

of instructor. A study of the nucleus, radioactivity, nuclear reactions, fission, fusion, interactions of radiation with matter and measurement of radiation. (*Spring*)

PHYS 6271. Advanced Solid State Physics. (3)

Prerequisite: Permission of instructor. Crystal structure. Electromagnetic, electron, mechanical, and elastic wave interactions with crystals. Theory of X-ray diffraction. Energy band theory of metals and semiconductors. Optical properties of solids, phase transitions, and amorphous solids. Quantum mechanics of covalent bonding, phonon excitation, and thermal energy. (*On demand*)

PHYS 6281. Modern Optics Laboratory. (3) Prerequisite:

PHYS 3281 or permission of instructor. Selected experiments in such modern optics areas as fiber optics,

holography, spectroscopy, and Fourier optics. Six laboratory hours each week. (*Spring*)

PHYS 6301. Radiation Detection, Instrumentation, and Data Analysis. (3) Charged particle, neutron, and photon detection. Signal processing and data recording methods including techniques of data analysis and error propagation. The course will consist of two lectures and one two-hour laboratory each week. The course will emphasize application of radiation detectors used in radiotherapy and diagnostic radiology. Two lecture hours and one two-hour laboratory each week. (*Fall*)

PHYS 6302. Radiation Protection and Dosimetry. (3) Radiation dosimetry fundamentals including photon, electron, and neutron dosimetry. Radiation transport. Fundamentals of radiation protection and shielding. Assessment of effective dose. Three lecture hours per week. (*Spring*)

PHYS 6303. Imaging in Medicine. (3) Prerequisites: PHYS 6210 and PHYS 6301. The fundamental conceptual, mathematical, and statistical aspects of imaging science, and a survey from this formal viewpoint of various medical imaging modalities, including film-screen radiography, positron and x-ray computed tomography, ultrasound, and magnetic resonance imaging. (*Fall*)

PHYS 6304. Physics of Diagnostic Radiology and Radiotherapy. (3) Prerequisites: PHYS 6210 and PHYS 6302. Physics of x-ray diagnostic procedures and equipment. Physics of the interaction of the various radiation modalities with body-equivalent materials. Physical aspects of clinical applications including radiation therapy to cause controlled biological effects in patients. Three lecture hours per week. (*Spring*)

PHYS 6401. Clinical Medical Physics. (1-3) Prerequisite: Permission of Program Director. Eighty to one hundred supervised contact hours of clinical internship at a regional health care system. May be repeated for a maximum of 12 credit hours. Graded Pass/No-credit. (*Fall, Spring, Summer*)

PHYS 6991. Physics Thesis Research I. (1-3) Prerequisite: admission to candidacy and permission of instructor. Research for the thesis. Letter grade assigned. May be repeated to accumulate a maximum of 6 hours credit. (*Fall, Spring, Summer*)

PHYS 6992. Physics Thesis Research II. (1-4) Prerequisite: PHYS 6991 and permission of instructor. Research for the thesis. Graded pass/no-credit. May be repeated to accumulate a maximum of 4 hours credit. (*Fall, Spring, Summer*)

PHYS 7999. Master's Degree Graduate Residency Credit. (1) (*Fall, Spring, Summer*)

Psychology

- **Ph.D. in Health Psychology** (*see section on Inter-College Graduate Programs*)
- **Ph.D. in Organizational Science** (*see Organization Science*)
- **M.A. in Psychology**

Department of Psychology

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Clinical/Community Coordinator

Dr. Richard Tedeschi

Industrial/Organizational Director

Dr. Eric Heggstad

Graduate Faculty

Clinical/Community Psychology

Art Blume, Associate Professor
Lawrence G. Calhoun, Professor
James R. Cook, Associate Professor
George Demakis, Assistant Professor
C. D. (Denny) Fernald, Associate Professor Emeritus
Mason Haber, Assistant Professor
Ryan Kilmer, Assistant Professor
Albert A. Maisto, Bonnie Cone Distinguished Professor
Richard D. McAnulty, Associate Professor
Amy Peterman, Associate Professor
Sam Simono, Professor Emeritus
Richard Tedeschi, Professor and Coordinator
Jennifer Webb, Assistant Professor

Industrial/Organizational

Anita Blanchard, Assistant Professor
Kimberly K. Buch, Associate Professor
David C. Gilmore, Associate Professor
Eric Heggstad, Assistant Professor
Jo Ann Lee, Associate Professor
Charlie Reeve, Associate Professor
Steven Rogelberg, Professor and Director
William D. Siegfried, Associate Professor
Linda Shanock, Assistant Professor

Other members of the Graduate Faculty

Arnie Cann, Professor
Mark Faust, Assistant Professor
Paul W. Foos, Professor
Virginia Gil-Rivas, Assistant Professor
Jane F. Gaultney, Associate Professor
Paula Goolkasian, Professor
Nakia Gordon, Assistant Professor
Douglas L. Grimsley, Professor

Susan K. Johnson, Assistant Professor
 W. Scott Terry, Professor
 Lori Van Wallendael, Associate Professor

MASTER OF ARTS IN CLINICAL/COMMUNITY PSYCHOLOGY

The objective of the master's degree program in Clinical/Community Psychology is to train psychologists in the knowledge and skills necessary to address problems encountered in modern living. The program provides a foundation in the research methods and content of basic psychology as well as training in the applied skills of professional practice. The relatively small, competitively selected student body receives individual attention from faculty members who maintain rigorous standards of academic excellence.

Students develop knowledge and skills in psychological assessment, learn various treatment and intervention strategies, and work with a variety of populations in consultation, evaluation, and research. An extensive practicum component utilizes the Charlotte area as a setting for applied experience.

The program prepares students for the North Carolina psychology licensure exam and for positions in diverse settings such as community mental health centers, correctional facilities, and other human service programs. We prefer to admit students who plan to pursue a doctoral degree.

Additional Admission Requirements

To be considered for admission to graduate study in Clinical/Community Psychology, a student must present the following requirements in addition to those required by the Graduate School:

- 1) Completed application by March 1
- 2) 18 hours of undergraduate psychology including Introductory Psychology & Research Methods
- 3) An undergraduate course in statistics
- 4) Acceptable scores on the Verbal and Quantitative GRE
- 5) The GRE subject test in psychology is recommended for applicants who were no psychology majors

Admission to the program is very competitive for the spaces available each year. Most students who are admitted have much better records than the minimum required. The primary Clinical/Community Psychology application deadline is March 1 for admission in the fall semester, but if space is still available, late applications will be considered until May 1. Students may not begin the program during the spring semester.

Degree Requirements

The Clinical/Community Psychology program requires at least 48 semester hours of graduate coursework. Full-time students should be able to complete the program in two calendar years. A thesis and comprehensive exam are required.

Basic Knowledge and Methods in Psychology (14 hours)

- PSYC 6102 Research Design and Quantitative Methods in Psychology (3)
- PSYC 6107 Ethical and Professional Issues in Psychology (2)
- PSYC 6999 Thesis (3)

and two courses (6 hours) selected from the following:

- PSYC 6010 Topics in Learning and Cognition (3)
- PSYC 6015 Topics in Perception and Physiological Psychology (3)
- PSYC 6020 Topics in Developmental Psychology (3)
- PSYC 6030 Topics in Social Psychology and Personality (3)

Clinical/Community Coursework (34 hours)

- PSYC 6050 Topics in Psychological Treatment (3)
- PSYC 6141 Intellectual Assessment (4)
- PSYC 6142 Personality Assessment (4)
- PSYC 6145 Applied Research Design & Program Evaluation (3)
- PSYC 6150 Psychological Treatment (4)
- PSYC 6151 Behavior Disorders (4)
- PSYC 6155 Community Psychology (3)
- PSYC 6450 Practicum in Clinical Psychology (3)
- PSYC 6455 Practicum in Community Psychology (3)

Or a second

- PSYC 6450 Practicum in Clinical Psychology (3)
- Elective (*Selected in consultation with advisor*) (3)

Hours beyond the 48 hours may be required by the academic advisor and the Clinical/Community Program Committee. The faculty conduct a thorough review of student performance on a regular basis. Continuation in the program is contingent upon a favorable review during these evaluations. Students who consistently show borderline course performance, who are not developing good applied skills in the practice of psychology, who fail to complete coursework in a timely basis, or who otherwise perform unprofessionally or unsatisfactorily, may be required to complete additional courses or practicum work, or may be removed from the program. The enrollment of a student who receives three grades of *C* or one *Unsatisfactory* grade during his or her graduate career is automatically terminated.

Comprehensive Examinations

All students are required to successfully complete comprehensive examinations covering research design, ethics and knowledge of clinical/community psychology. Students who fail the comprehensive exam twice are removed from the program.

Assistantships

A variety of resources are available for financial assistance. These include teaching assistantships to proctor the general psychology laboratory, research assistantships from faculty grants, and graduate assistantships in other campus units such as the Learning Center and Disability Student Services. These range in pay from \$8,000 to \$12,000 per academic year.

Research Experiences

Students are encouraged to become involved in ongoing research in the department, and they are required to complete a thesis.

Practica

Practica, involving practical experience working with human service agencies in the region, are a required part of the program.

MASTER OF ARTS IN INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY

The objective of UNC Charlotte's nationally recognized master's degree program in Industrial/Organizational Psychology is to provide students with the knowledge and skills necessary to research and improve the world of work from both an employee and organizational point of view. Among the issues studied are personnel selection, training and development, performance evaluation, workplace health, employee attitudes and satisfaction, work motivation, team and organizational effectiveness, and change management. The relatively small, competitively selected student body receives individual attention from faculty members who maintain rigorous standards of academic excellence. The program provides a firm foundation in the research methods and content of basic psychology as well as training in the applied skills of professional practice.

Additional Admission Requirements

To be considered for admission to graduate study in I/O, a student must meet the following minimum requirements:

- 1) Completed application (Deadline: January 15)
- 2) Bachelor's degree from an accredited institution
- 3) Grade point average above 3.0 overall
- 4) GRE Math and Verbal, combined, of over 1000.
- 5) Official transcripts
- 6) 3 letters of recommendation
- 7) Statement of professional goals

Admission to our full-time program is very competitive. Applicants whose native language is other than English must offer acceptable scores on the Test of English as a Foreign

Language. The primary application deadline is January 15 for admission in the fall semester, but if space is available, late applications will be considered until May 1. Students may not begin the program during the spring semester.

Degree Requirements

The Industrial/Organizational program requires at least 43 semester hours of graduate coursework as specified and discussed in the psychology graduate student handbook. Full-time students should be able to complete the program in two calendar years.

Students who consistently show borderline course performance, who fail to complete coursework on a timely basis, or who otherwise perform unprofessionally or unsatisfactorily, may be required to complete additional courses or may be removed from the program. The enrollment of a student who receives three grades of *C* or one *Unsatisfactory* grade during his or her graduate career is automatically terminated.

Specialization

Students will be able to pick a specialization track: A non-thesis research track, a thesis research track, or a practice track. These tracks allow the student to tailor, in part, their educational experience to their career objectives. All students will complete a comprehensive examination at the end of their program. For those students doing a thesis, the thesis defense itself serves as the comprehensive exam. For those on the non-thesis research track or a practice track, a standardized comprehensive examination will be given in the spring of year 2 in the program. The examination samples content from across the I/O Psychology discipline as well as research design. A complete description of the specialization tracks and requirements (including a thorough discussion of comprehensive exams) can be found in the most recent version of the department of psychology graduate student handbook.

Assistantships and Other Financial Assistance

A variety of resources are available for financial assistance. These include teaching assistantships to proctor the general psychology laboratory, research assistantships to assist on faculty grants, and graduate assistantships in psychology and other campus units such as the Learning Assistance Center and the University Honors Office. Information on loans, grants and employment opportunities is available from the Financial Aid Office.

Research Experiences

In addition to the completion of a thesis, students have the opportunity to work with individual faculty members on their research. The Department of Psychology has an energetic and dynamic faculty of more than 30 psychologists who are committed to education and have established an excellent record of productivity in all the major areas of psychological research and professional practice. Students also have the opportunity to work closely with the Management Department faculty affiliated with the

program as well as two I/O faculty members from Davidson College affiliated with the program.

Practica and Applied Experiences

Students will have a wide range of opportunities for applied experiences. These can occur as part of a formal practicum experience or more informally through the UNCC Organizational Science Consulting and Research Unit.

COURSES IN PSYCHOLOGY

PSYC 6000. Organizational Science Overview. (3) Cross-listed as OSCI 8000. Prerequisites: Full graduate standing in the I/O psychology graduate program or permission of the instructor. Provides broad overview of the field of Organizational Science including its historical foundations. Each week is a mini-seminar on a particular topic within the field. *(Fall)*

PSYC 6001. Current Topics and Events in Organizational Science. (1) Cross-listed as OSCI 8001. Prerequisites: Full graduate standing in the I/O psychology graduate program or permission of the instructor. New and innovative research and practice topics related to Organizational Science will be discussed/delivered/facilitated by student researchers, faculty and invited speakers. These “cutting edge” topics will span all of micro and macro organizational science and will change each semester. Pass/unsatisfactory grading. May be repeated for credit. *(Fall, Spring)*.

PSYC 6002. Ethics and Professional Issues in Organizational Science. (2) Cross-listed as OSCI 8002. Prerequisites: Full graduate standing in the I/O psychology graduate program or permission of the instructor. Discusses ethical standards in professional practice, testing, research; business ethics; expectations and problems confronting organizational science practitioners in industrial and professional organizations. *(Fall)*

PSYC 6003. Writing & Publishing in Organizational Science. (1 or 2) Cross-listed as OSCI 8003. Prerequisites: Full graduate standing in the I/O psychology graduate program or permission of the instructor. Seminar to enhance effective technical/scientific writing (e.g., learning APA style, presentation of statistical analyses) and understanding the publication process (e.g., selecting an appropriate outlet, preparing a manuscript, the review process). Students will actively engage in writing as well as the review process (as both a reviewer and reviewee). *(Fall)*

PSYC 6010. Topics in Learning and Cognition. (3) An examination of selected topics in the areas of learning, memory and cognition, and behavior modification, with an emphasis on the applications to the areas of clinical, community and industrial psychology. May be repeated for credit with the permission of department. *(Alternate years)*

PSYC 6015. Topics in Perception and Physiological Psychology. (3) An examination of selected topics in the areas of sensation and perception, physiological and neuropsychology, with an emphasis on the applications to the areas of clinical, community, and industrial psychology. May be repeated for credit with the permission of department. *(Alternate years)*

PSYC 6020. Topics in Developmental Psychology. (3) An examination of selected topics in child and adult development, aging, and developmental disabilities, with an emphasis on the applications to the areas of clinical, community, and industrial psychology. May be repeated for credit with the permission of department. *(Alternate years)*

PSYC 6030. Topics in Social Psychology and Personality. (3) An examination of selected topics in personality and social psychology, with an emphasis on the applications to the areas of clinical, community, and industrial psychology. May be repeated for credit with the permission of department. *(Alternate years)*

PSYC 6050. Topics in Psychological Treatment. (3) Cross-listed as PSYC 8050. Prerequisite: PSYC 6151. A topical course which will focus on issues in treatment, alternative treatment perspectives, special client populations. May be repeated for credit with departmental permission. *(Yearly)*

PSYC 6099. Topics in Psychology. (3) Cross-listed as PSYC 8099. A discussion of selected topics in psychology. May be repeated for credit as topics vary. *(On demand)*

PSYC 6102. Research Design and Quantitative Methods in Psychology. (3) Prerequisites: MATH 1222 and PSYC 2102 or equivalent. Experimental and correlational methods of psychological research, including single subject designs with emphasis on research design and the application of statistical methods to psychological research. *(Fall)*

PSYC 6107. Ethical and Professional Issues in Psychology. (2) Roles and responsibilities of psychologists, including ethical standards in professional practice, testing and research; expectations and problems confronting psychologists in industrial, clinical and professional organizations. *(Fall)*

PSYC 6111. Psychology of Learning and Memory. (3) Principles, theories and current research in learning with emphasis on human learning and memory. *(On demand)*

PSYC 6112. Applied Behavior Analysis. (3) Use of behavior principles in applied settings. Topics include: behavioral assessment, positive and negative reinforcement, punishment, extinction, stimulus control, maintenance and generalization of behavior change. Each student will design and carry out a behavior change project. *(On demand)*

PSYC 6113. Physiological Psychology. (3) The relationships between the nervous system and behavior.

Topics include the structure of the nervous system and nerve conduction, the functional organization of the central nervous system, neuronal and hormonal control of behavior, biofeedback and other appropriate topics. *(On demand)*

PSYC 6115. Sensation and Perception. (3) Processes involved in receiving and interpreting sensory data including all the sensory systems with an emphasis on vision. *(On demand)*

PSYC 6120. Developmental Psychology. (3) Psychological development across the lifespan. *(On demand)*

PSYC 6124. Psychology of Aging. (3) Psychology of aging with particular emphasis on issues related to community/clinical psychology and industrial/organizational psychology. Topics include myths and stereotypes about aging, problems faced by older workers, retirement, mental health and normal aging, counseling the older adult, and psychological disorders in later life. *(Spring)*

PSYC 6130. Social Psychology. (3) Cross-listed as OSCI 8130. Human social behavior; topics include affiliation, person perception, conformity and attitudes. *(On demand)*

PSYC 6135. Psychology of Personality. (3) A critical evaluation of major personality theories including an extensive survey of current research. *(On demand)*

PSYC 6140. Psychological Measurement and Evaluation. (3) Prerequisite: PSYC 6102. Measurement of psychological characteristics; scaling, reliability, validity and norms; construction and use of the intelligence tests, personality inventories, interest tests, attitude scales, etc., interviewing, survey techniques and behavioral assessment. *(Spring)*

PSYC 6141. Intellectual Assessment. (4) Theories of intelligence and methods of intellectual assessment, including practice in administering intelligence tests, interpreting results, and writing evaluation reports. Three lecture hours and one two-hour lab per week. *(Fall)*

PSYC 6142. Personality Assessment. (4) Prerequisite: PSYC 6151, 6141 or permission of department. Theories and methods used in the assessment of personality and psychopathology, including practice in administering personality tests, interpreting results and writing evaluation reports. Three lecture hours and one two-hour lab per week. *(Spring)*

PSYC 6145. Applied Research Design and Program Evaluation. (3) Prerequisite: PSYC 6102. Models of evaluative research; also techniques, designs and administration of program evaluation. Topics include role conflicts, entry issues, goal setting, research for program planning and implementation and examples of actual program design and evaluation. *(Spring)*

PSYC 6150. Introduction to Psychological Treatment. (4) Prerequisite: PSYC 6151. Major approaches to psychological intervention, including psychodynamic, behavioral, humanistic and cognitive-behavioral systems. Emphasis on practical therapy considerations, including crisis intervention, client behaviors at various stages of therapy, handling difficult clients and ethical and professional issues. Three lecture hours and one two-hour lab per week. *(Spring)*

PSYC 6151. Behavior Disorders. (4) Diagnostic systems in current use and the implications of these systems for psychologists; several perspectives on psychological processes, behavior disorders and diagnosis including psychodynamic, behavioral and social models; practice in diagnostic interviewing. Three lecture hours and one two-hour lab per week. *(Fall)*

PSYC 6153. Classification of Psychological Dysfunctions. (3) Introduction to systems for classifying psychological disorders for counselors and review of current theoretical, experimental, and clinical perspectives on abnormal psychology, including the current Diagnostic and Statistical Manual of Mental Disorders. Credit will not be given for both PSYC 6153 and PSYC 6151. *(Spring)*

PSYC 6155. Community Psychology. (3) Research, intervention techniques and settings associated with major approaches in community psychology including the mental health, organizational, ecological and social action models. *(Fall)*

PSYC 6171. Industrial/Organizational Psychology. (3) Human behavior within organizations. Topics include personnel selection and placement, job analysis, motivation, satisfaction, consumer psychology and ergonomics. *(Fall)*

PSYC 6171L. Laboratory in Industrial/Organizational Psychology. (1) Corequisite: PSYC 6171. Practice in administration and scoring of surveys and tests. Experience in role plays, training practices, and interviews. *(Fall)*

PSYC 6172. Personnel I. (3) Prerequisite or corequisite: PSYC 6171, 6140. Techniques of applied personnel psychology. Topics include job analysis, testing in industry, interviews, personality measures, assessment centers, job evaluation, and polygraphs. *(Spring)*

PSYC 6173. Individual Dynamics. (3) The individual within the organization. Special emphasis on theories of motivation and job satisfaction. *(On demand)*

PSYC 6174. Organizational Dynamics I. (3) Prerequisite: PSYC 6171. Group processes, including group formation, group decision making, leadership and group structure. *(Spring)*

PSYC 6175. Organizational Dynamics II. (3) Prerequisite: PSYC 6174. Organization theories and organizational change methods. *(Fall)*

PSYC 6176. Counseling Psychology in Organizations. (3) Application of psychology to special problems within the organization, especially the counseling of employees experiencing life problems: for example, retirement, alcoholism, interpersonal conflict. (*On demand*)

PSYC 6177. Personnel II. (3) Prerequisite: PSYC 6172. Theoretical bases of personnel psychology. Topics include performance appraisal, legal issues, personnel strategies, validation issues, utility analysis, human resource planning and training. (*Fall*)

PSYC 6200. Health Psychology. (3) Intensive review of the contributions of the discipline of psychology to the promotion and maintenance of health, the prevention and treatment of illness, and the improvement of the health care system. The course will examine links between psychology and health by emphasizing interactions among biological, behavioral and social systems that impact health and illness experiences. Topics will include stress, coping, pain, chronic disease and psychoneuroimmunology. Emphasizes the relevance of age, gender, personality, and culture for understanding health related behaviors. (*Fall*)

PSYC 6202. Methods in Health Psychology. (3) Prerequisite: PSYC 6102 and PSYC 6200. Advanced review of qualitative and quantitative issues relevant to the conduct of health and behavior research. Topics include assessment of quality of life; instrument sensitivity, specificity, and responsiveness; and, the evaluation of health service delivery. Emphasizes the development of methodological, analytical, and interpretive skills necessary to evaluate practices, programs, and policies in health psychology. (*Spring*)

PSYC 6203. Research Design and Quantitative Methods I. (3) Cross-listed as PSYC 8102. Prerequisites: Admission to a Ph.D. program in Psychology or permission of the department. An overview of basic experimental and covariation research designs and the application of descriptive and inferential statistics to the designs. The focus will be on univariate designs, including simple and complex group comparisons, and basic correlational and linear regression strategies. (*Fall*)

PSYC 6204. Research Design and Quantitative Methods II. (3) Cross-listed as PSYC 8103. Prerequisites: Full graduate standing in a Psychology graduate program or permission of the instructor. An introduction to advanced experimental and covariation research strategies. The focus will be on a thorough exploration of applied multiple regression analysis. A brief introduction to selected multivariate models such as discriminant analysis, multivariate analysis of variance, log-linear models, factor analysis, and structural equation modeling will also be provided. (*Spring*)

PSYC 6205. Field and Lab Based Quantitative Research Methods. (3) Cross-listed as OSCI 8205. Prerequisites: Full graduate standing in a psychology graduate program or

permission of the instructor. Examines quantitative approaches to Organizational Science research such as experimental designs, quasi-experimental designs, organizational surveys, longitudinal models and field research. (*Yearly*)

PSYC 6206. Qualitative Research Methods. (3) Cross-listed as OSCI 8206. Prerequisites: Full graduate standing in a psychology graduate program or permission of the instructor. Examines qualitative approaches to Organizational Science research such as focus groups, verbal protocol, interviewing, naturalistic observation, and content analysis. (*Yearly*)

PSYC 6207. Psychometrics. (3) Cross-listed as OSCI 8207. Prerequisites: Full graduate standing in a psychology graduate program or permission of the instructor. Presents an introduction to classical and modern test theory and methods. Theoretical and statistical bases for the measurement of psychological constructs are covered including Classical True Score Theory, reliability and validity inferences, item response theory, scaling, and an introduction to factor analysis. (*Yearly*)

PSYC 6213. Physiological Foundations of Health Psychology. (3) Prerequisite: PSYC 6200. Biological theories and models will be introduced and applied to health issues. Topics may include addiction, mental illness, neuropsychology, and psychophysiology. Emphasizes the relation between the nervous system and behavior for understanding health and illness. (*Fall*)

PSYC 6230. Applications of Social Psychology to Health Psychology. (3) Prerequisite: PSYC 6200. Social psychology theories and models will be introduced and applied to health issues. Topics may include the role of social perception processes in understanding and adjusting to illness, social influence strategies and promoting health-maintaining behaviors, self-efficacy and coping, and other factors related to health maintenance or recovery. (*Spring*)

PSYC 6260. Topics in Health Psychology. (3) Prerequisite: PSYC 6200. An examination of selected topics in Health Psychology. May be repeated for credit with departmental approval. (*On demand*)

PSYC 6261. Independent Study in Health Psychology. (1-3) Prerequisite: PSYC 6200. Directed individual study of an issue in health psychology arranged with a faculty member. May be repeated for credit. (*Fall, Spring, Summer*)

PSYC 6262. Practicum in Health Psychology. (1-3) Prerequisite: PSYC 6200 and permission of the department. Experience in assessment and treatment with clients at local health agencies under supervision from a faculty member on campus. Applications of the principles of health psychology to special problems within a health care organization or setting. May be repeated for credit with departmental approval. (*Fall, Spring, Summer*)

PSYC 6450. Practicum in Clinical Psychology. (1-3)
Prerequisites: PSYC 6150 and permission of department.
Experience in clinical assessment and/or psychotherapy with clients at local agencies under supervision from a faculty member on campus. May be repeated for credit with departmental approval. (*Fall, Spring, Summer*)

PSYC 6455. Practicum in Community Psychology. (1-3)
Applications of the principles of community psychology to special problems within an organization or community setting. The project might include, but would not be limited to, consultation, program development, training, community education or program evaluation. May be repeated for credit with departmental approval. (*Fall, Spring*)

PSYC 6477. Projects in Industrial/Organizational Psychology. (1-3) Prerequisite: PSYC 6171. A structured practicum experience or research paper in industrial/organizational psychology. May be repeated for credit with departmental approval. (*Fall, Spring, Summer*)

PSYC 6610. Micro Organizational Science I. (3) Cross-listed as OSCI 8610. Prerequisites: Full graduate standing in the I/O psychology graduate program or permission of the instructor. Examines research, theory and application regarding individual differences (e.g., abilities, personality), assessment (e.g., tests, inventories, interviews, assessment centers), criterion development (e.g., job analysis, performance models) and organizational staffing processes (i.e., recruitment, selection, basic legal concepts). (*Yearly*)

PSYC 6611. Macro Organizational Science I. (3) Cross-listed as OSCI 8611. Prerequisites: Full graduate standing in the I/O psychology graduate program or permission of the instructor. Examines research, theory and application on the following topics: motivation, communication systems and processes, stress, job design, leadership, employee attitudes and emotions, teamwork, and decision making. (*Yearly*)

PSYC 6620. Micro Organizational Science II. (3) Cross-listed as OSCI 8620. Prerequisites: Full graduate standing in the I/O psychology graduate program or permission of the instructor. Examines research, theory and application regarding post-entry personnel issues such as training, performance management, performance appraisal, compensation, and employee socialization. (*Yearly*)

PSYC 6621. Macro Organizational Science II. (3) Cross-listed as OSCI 8621. Prerequisites: Full graduate standing in the I/O psychology graduate program or permission of the instructor. Examines research, theory and application on the following topics: organizational development, organizational change, organizational climate, organizational culture, organizational theory, and relations between organizations and their environment. (*Yearly*)

PSYC 6630. Micro Seminar in Organizational Science. (3) Cross-listed as OSCI 8630. Prerequisites: Full graduate

standing in the I/O psychology graduate program or permission of the instructor. Examination of special topic(s) germane to Micro Organizational Science. The seminar may focus on one or a small number of topics salient to this area. Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit for different topics. May be repeated for credit. (*On demand*)

PSYC 6640. Macro Seminar in Organizational Science. (3) Cross-listed as OSCI 8640. Prerequisites: Full graduate standing in the I/O psychology graduate program or permission of the instructor. Examination of special topic(s) germane to Macro Organizational Science. The seminar may focus on one or a small number of topics salient this area. Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit for different topics. May be repeated for credit. (*On demand*)

PSYC 6650. Research Methods Seminar in Organizational Science. (3) Cross-listed as OSCI 8650. Prerequisites: Full graduate standing in a psychology graduate program or permission of the instructor. Examination of special topic(s) germane to research methods in Organizational Science. The seminar may focus on one or a small number of topics that define this area (e.g., a data analytic technique, a methodological approach). Extensive reading and discussion of topics from multiple perspectives. May be repeated for credit. (*On demand*)

PSYC 6899. Readings and Research in Psychology. (1-4) Prerequisite: permission of instructor and department to be obtained in the semester preceding the semester in which the course is to be taken. Individual study in psychology which may take the form of conducting empirical research or formulating a critique and synthesis of existing research. May be repeated for credit. (*Fall, Spring, Summer*)

PSYC 6999. Thesis. (1-3) The thesis is coordinated with the student's interests and practical experience during the second year to allow the development of an area of specialization. Thesis projects can be of three types: an original experiment that will contribute to the psychological literature; a thorough case analysis including literature review and application; the development of a community psychology program or intervention to accomplish an important, well-defined goal. A completed paper and oral presentation are required. May be repeated for credit with departmental approval. (*Fall, Spring, Summer*)

PSYC 7999. Master's Degree Graduate Residency Credit. (1) (*Fall, Spring, Summer*)

Public Administration

- **Master of Public Administration (MPA)**
- **Graduate Certificate in Emergency Management**
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Department of Political Science

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Suzanne Leland, Associate Professor
Tiffany Manuel, Assistant Professor
Gary R. Rassel, Associate Professor
David Swindell, Associate Professor
Bradley Wright, Assistant Professor

MASTER OF PUBLIC ADMINISTRATION (MPA)

The primary objective of the Master of Public Administration (M.P.A.) degree program is to provide professional training in public administration. The curriculum of this NASPAA accredited program emphasizes the analysis of the political and administrative environments as well as the administrative decision-making approaches of public administration. Application of techniques and administrative skills to the management of nonprofit organizations is also included in the curriculum. The methods of instruction employed in the program expose students to a variety of approaches to public management.

Students may enroll in the Master of Public Administration program on either a full-time or part-time basis. The majority of classes are scheduled in the evening throughout the year. However, some classes are scheduled on Saturdays and during the afternoon. Classes meet on the main campus and at UNC Charlotte Uptown Center.

Admission Requirements

Admission to the Master of Public Administration program is open to qualified graduates of recognized colleges and universities accredited by a regional or general accrediting agency. There are seven major requirements for admission:

- 1) Application in writing submitted to the Graduate Admissions Office, accompanied by the application fee, which is neither deductible nor refundable.
- 2) Possession of a bachelor's degree, or its equivalent, from an accredited college or university.
- 3) An undergraduate grade point average of at least 3.0 on a 4.0 scale.
- 4) An appropriate score on the Verbal, Quantitative, and Analytical portions of the Graduate Record Exam (GRE). Although there is no required score for these exams, typically an acceptable score would be above the 35th percentile.
- 5) A written statement of professional career goals and a description of any significant work experience, particularly in the public or nonprofit sectors.
- 6) Three supporting letters of recommendation from professors or employers.
- 7) Submission of two official transcripts from all postsecondary educational institutions in which the candidate was enrolled.

Prerequisite Requirements

In addition to the admission requirements, MPA students must complete the following prior to taking MPAD 6126, MPAD 6131, MPAD 6134, and their elective coursework: POLS 1110, Introduction to American Government (or the equivalent) with a grade of C or higher; STAT 1222, Elementary Statistics for the Social Sciences (or the equivalent) with a grade of C or higher; and demonstrate proficiency in computer applications. Students may complete these after admission into the program.

Degree Requirements

The Master of Public Administration program is structured in three distinct phases: 1) core, 2) advanced work, and 3) directed study or research project. In all, the program requires 40 hours of graduate credit for completion of the degree. The MPA Program Handbook, available on the program web site, presents the most up-to-date listing of degree requirements.

I. Core

All students are required to complete 18 hours in core study. The emphasis in the core is twofold: (a) Understanding the various managerial and analytical approaches salient to the environment of public administration, and (b) Achieving an overall perspective on the problems of public administration. Students must attain a grade of B or higher in each core course prior to enrolling in MPAD 6187 and MPAD 6188. Students earning grades of C in a core course must retake that course at the earliest possible opportunity. The core courses are:

MPAD 6102 Foundations in Public Admin (3)

MPAD 6104 Public Organizations & Management (3)

- MPAD 6125 Quantitative Research Methods in Public Administration (3)
 MPAD 6126 Data Analysis for Decision Making (3)
 MPAD 6131 Public Budgeting and Finance (3)
 MPAD 6134 Human Resources Management (3)

II. Advanced Courses

a) **Electives:** The MPA program offers several advanced elective courses in areas important to public administrators. With the approval of the Director, students may take advanced elective work with other departments. Students are required to take a minimum of fifteen hours of advanced electives unless they opt for the Directed Study option (see below) in which case they need only take twelve hours of advanced electives. The MPA electives are:

- MPAD 6000 Topics for Graduate Study in Public Administration (1-4)
 MPAD 6128 Foundations of Public Policy Analysis
 MPAD 6140 Labor Management Relations in Government (3)
 MPAD 6141 Conflict Management in Public Organizations (3)
 MPAD 6142 Managing Grants and Contracts in the Public & Nonprofit Sectors (3)
 MPAD 6143 Introduction to Administrative Law (3)
 MPAD 6144 Changing the Public Organization (3)
 MPAD 6160 Information Systems in Public Administration (3)
 MPAD 6170 Communication Law and Policy (3)
 MPAD 6172 Administration of Health Care Systems in the U.S. (3)
 MPAD 6174 Public Policy & Politics in Health Care Administration (3)
 MPAD 6176 Trends and Issues in Health Care Administration (3)
 MPAD 6184 Urban Government and Politics
 MPAD 6185 Intergovernmental Relations (3)
 MPAD 6210 Aging and Public Policy (3)
 MPAD 6211 Administration of Aging Programs (3)
 MPAD 6290 Emergency Management (3)
 MPAD 6291 Homeland Security (3)
 MPAD 6292 Disaster Management (3)
 MPAD 6293 Fighting Terrorism (3)
 MPAD 6310 Foundations of the Nonprofit Sector (3)
 MPAD 6311 Intro to Nonprofit Management (3)
 MPAD 6324 Financial Analysis for Government & Nonprofit Organizations (3)
 MPAD 6326 Applied Economics for Public Administrators (3)
 MPAD 6327 Internal Capacity Building in Nonprofit Organizations (3)
 MPAD 6328 Urban & Community Development (3)
 MPAD 6329 Nonprofit Organizations and the Environment (3)
 MPAD 6330 Program Evaluation for the Public & Nonprofit Sectors (3)
 MPAD 6820 Independent Study (1-3)

b) **Capstone Seminar:** Students are required to complete MPAD 6187: Advanced Seminar in Public Management Problem Solving as a capstone course. Students must successfully complete all of their core courses with a grade of B or better prior to enrolling in this course.

III. Directed Study or Research Applications (each MPA student must complete one of the options “a” or “b”). Students must successfully complete all of their core courses with a grade of B or better prior to enrolling in any courses listed in this section.

a) **Research Applications:** Students who select this option will complete a one-semester written project course on an approved topic of significance in public administration or nonprofit management. The project will include the submission of revised paper drafts based on instructor evaluation. Students must enroll in the following course which is graded A, B, C, or U:

- MPAD 6188 Research Applications in Public Administration (3)

b) **Directed Study:** Students who select this option will complete a written project on a topic of significance based on a field experience or research in public administration, nonprofit management, or arts administration. The Directed Study requires the following courses, graded on a pass/fail basis:

- MPAD 6800 Directed Study in Public Administration (Proposal) (3)
 MPAD 6801 Directed Study in Public Administration (Completed Study) (3)

University regulations governing the preparation and submission of Master’s theses apply to the Directed Study option. Rules for the Directed Study committee are provided in the MPA Program Handbook. Students who select option “b” may take one less elective course for 3 credits to complete the MPA degree in the required 39 hours.

Admission to Candidacy Requirements

Students are required to complete an “Application for Admission to Candidacy” due November 1st (for May graduation), September 1st (for December graduation), or May 1st (for August graduation). This form lists all courses to be counted toward the degree. It must be signed by the student and returned to the MPA Program office. The form is available online from the Graduate School web page.

Assistantships

The department offers a number of graduate assistantships each academic year. To apply for an assistantship students must submit a completed “Application for Graduate Assistantship” form and a copy of their resume to the MPA Director. Graduate assistantships are also available in several administrative units on campus. The application form is available online from the Graduate School web page.

Internships

Each student in the Master of Public Administration Program is required to complete a field experience. This requirement may be satisfied in one of these ways: (1) through a position in a public or nonprofit organization; (2)

through a position in a business where the work experience is approved for internship by the MPA director; or (3) through an approved internship in a public or nonprofit organization. Each student must complete an “MPA Internship Information” form and submit it to the MPA office for approval. Forms to evaluate the internship experience must also be completed. These forms are available in the main MPA office. Current guidelines for the internship requirement are provided in the MPA Program Handbook.

Degree Concentrations

Students may either develop their own program of study with their elective credits or complete one of four approved 15 credit hour concentrations. Students who choose a concentration must focus their research in MPAD 6188, or MPAD 6800 and MPAD 6801 on an approved topic related to the concentration subject matter.

Nonprofit Management

The nonprofit management concentration consists of fifteen credit hours within the MPA curriculum. Students are required to take the following three courses:

- MPAD 6310 Foundation of the Nonprofit Sector (3)
- MPAD 6311 Intro to Nonprofit Management (3)
- MPAD 6324 Financial Analysis for Government and Nonprofit Organizations (3)

Additionally, students must complete six credit hours from the following list of courses:

- MPAD 6142 Managing Grants and Contracts in the Public & Nonprofit Sectors (3)
- MPAD 6327 Internal Capacity Building in Nonprofit Organizations (3)
- MPAD 6328 Urban and Community Development (3)
- MPAD 6329 Nonprofit Organizations and the Environment (3)
- MPAD 6330 Program Evaluation for the Public and Nonprofit Sectors (3)

Other appropriate courses can be taken as electives within this concentration upon approval of the student’s advisor and the MPA Director.

Urban Management and Policy

The urban management and policy concentration consists of fifteen credit hours within the MPA curriculum. Students are required to take the following three courses:

- MPAD 6128 Foundations of Public Policy (3)
- MPAD 6184 Urban Government and Politics (3)
- MPAD 6185 Intergovernmental Relations (3)

Additionally, students must complete six credit hours from the following list of courses:

- MPAD 6140 Labor Management Relations in Government (3)

- MPAD 6142 Managing Grants and Contracts in the Public and Nonprofit Sectors (3)
- MPAD 6143 Introduction to Administrative Law (3)
- MPAD 6160 Information Systems in Public Administration (3)
- MPAD 6290 Introduction to Emergency Management (3)
- MPAD 6324 Financial Analysis for Government and Nonprofit Organizations (3)
- MPAD 6328 Urban and Community Development (3)
- GEOG 5155 Retail Location (3)
- GEOG 5190 Geographic Info Systems for Non-Majors (3)
- GEOG 5210 Urban Planning Methods (3)
- GEOG 5260 Transportation Policy Formulation (3)
- GEOG 6300 Applied Regional Analysis (3)
- GEOG 6301 Industrial Location (3)
- GEOG 6500 Urban Planning: Theory and Practice (3)
- ACCT 6150 Tax Strategy and Policy (3)
- ECON 5180 Industrial Organization and Public Policy (3)
- ECON 6250 Advanced Urban and Regional Economics (3)
- ECON 6800 Benefit Cost Analysis (3)
- SOCY 5111 Social Inequity (3)
- SOCY 5131 Family Policy (3)
- SOCY 6137 The Political Economy and School Reform (3)

Other appropriate courses can be taken as electives within this concentration upon approval of the student’s advisor and the MPA Director.

Arts Administration

Prerequisites: For students with an undergraduate degree not in the arts: *You are required to take no less than four 3-credit hour undergraduate courses (or the equivalent) in order to develop the necessary foundation of appreciation for the arts required of arts administrators.* The exact set of courses will be determined by the field of arts on which you desire to focus and in consultation with your advisor. The prerequisites vary by visual arts, dance, theater, and music. Ideally, these prerequisites will be completed prior to admission into the MPA program. However, students who opt for the arts administration concentration after being admitted to the MPA program will have to complete these prerequisites prior to admission into MAAA 6160, MPAD 6187, or MPAD 6188. Substantive professional experience in the arts field can be used as a substitute or partial substitute (e.g. students may be required to take less than 4 arts courses) for the undergraduate prerequisites at the discretion of the MPA Director.

The arts administration concentration consists of fifteen credit hours within the MPA curriculum. Students are required to take the following two courses:

- MPAD 6311 Intro to Nonprofit Management (3)
- MAAA 6160 Marketing for the Arts (3)

Additionally, students must complete nine credit hours from the following list of courses:

- MAAA 5212 Contemporary Art Theory and Criticism (3)
- MAAA 6100 Curatorial Theory and Exhibition Design (3)
- MAAA 6101 Performance, Culture, and Community (3)
- MAAA 6125 New Technologies for Arts Organizations (3)
- MAAA 7100 Communication for the Arts (3)
- MAAA 7150 Education and Arts Administration (3)
- MPAD 6128 Foundations of Public Policy (3)
- MPAD 6142 Managing Grants and Contracts in Public & Non-Profit Sectors (3)
- MPAD 6160 Information Systems in Public Administration (3)
- MPAD 6170 Communication Law and Policy (3)
- MPAD 6324 Financial Analysis for Government and Non-Profit Organizations (3)
- MPAD 6327 Internal Capacity Building in Nonprofit Organizations (3)
- MPAD 6329 Nonprofit Organizations and the Environment (3)
- COMM 5102 Federal Interpretation of the First Amendment (3)
- COMM 6145 Communication Campaign Management (3)
- COMM 6146 Media Relations (3)
- HIST 6310 History Museums (3)
- HIST 6390 Collections Management (3)
- ANTH 5120 Intercultural Communications (3)
- ENGL 5182 Information Design & Digital Publishing (3)

Other appropriate courses can be taken as electives within this concentration upon approval of the student's advisor and the MPA Director.

Emergency Management

The concentration in Emergency Management within the Master of Public Administration degree program offers students training in the skills and administrative tools necessary to run public, nonprofit, and private sector programs involved in protecting citizens and infrastructure against catastrophic events as well as aiding and assisting them once such events have occurred. Topics of study include, but are not limited to, homeland security and terrorism, emergency prevention and response, and disaster management. The focus of the concentration is to enable graduates to manage emergency programs in the most effective, efficient, and legally sound manner.

The emergency management concentration consists of fifteen credit hours within the MPA curriculum. Students are required to take the following four courses:

- MPAD 6290 Introduction to Emergency Management (3)
- MPAD 6291 Homeland Security (3)

- MPAD 6292 Introduction to Disaster Management (3)
- GEOG 5190 Geographic Info Systems for Non-Majors (3)

Additionally, students must complete three credit hours from the following list of courses:

- MPAD 6141 Conflict Management in Public Organizations (3)
- MPAD 6185 Intergovernmental Relations
- MPAD 6293 Fighting Terrorism (3)
- GEOG 5130 Advanced Geographic Information Systems (3)
- CJUS 5103 International Criminal Justice
- CJUS 6120 Criminal Justice Mgmt & Decision Making (3)
- CJUS 6132 Legal Issues in Law Enforcement
- COMM 5102 Federal Interpretation of the First Amendment (3)
- COMM 6120 Communication and the Network Society (3)
- PSYC 6155 Community Psychology (3)
- ITIS 5250 Computer Forensics (3)
- CSLG 7680 Crisis Counseling (3)

Other appropriate courses can be taken as electives within this concentration upon approval of the student's advisor and the MPA Director.

Advising

Each student is assigned an advisor and given access to the MPA Program Handbook when admitted to the program. The advisor is a member of the MPA Program faculty. Students should meet with their advisors each semester to develop a schedule before registering. Students are also encouraged to meet with the Program Director for additional advising when necessary.

Transfer Credit

Up to six credits taken at another University can be transferred to the MPA program on the recommendation of the Director and the approval of the Dean of the Graduate School.

Scholarships

- 1) The North Carolina City and County Management Association funds a scholarship for an MPA student to help train students for careers in North Carolina local government. The MPA Program selection committee nominates the eligible recipient each fall.
- 2) Burkhalter Alumni Scholarship. The MPA Alumni Association has established a scholarship fund to honor a former Charlotte City Manager.
- 3) Brown-Dorton MPA Scholarship. The MPA selection committee nominates eligible recipients to community officials in Concord who determine the winner each fall.
- 4) Other awards are available on a competitive basis through the Graduate School.

- 5) Other professional associations occasionally offer scholarships for which MPA students have competed successfully.

Public Service Fellowships

The department works with local area government and nonprofit agencies to provide fellowships to students on a competitive basis. Host agencies employ fellows on a part-time basis (20 hours per week) for a period of one to two years. In exchange for their services, agencies pay fellows a small stipend and tuition expenses for Fall and Spring semesters.

Assistantships

The department offers a number of graduate assistantships each academic year. To apply for an assistantship students must check the appropriate box on the Graduate Admissions form. Graduate assistantships are also available in several administrative units on campus. The application form is available online from the Graduate School web page.

Tuition Waivers

Out-of-state tuition waivers are available to students appointed to graduate assistantships. These are awarded on a competitive basis. Partial waivers of in-state tuition are also awarded competitively to students who are residents of North Carolina. A limited number of partial tuition awards are made available through the Graduate School.

Financial Assistance

Other forms of financial aid, such as loans, are available. Students should contact the Financial Aid Office at 704-687-2461 for further information. Several administrative units on campus also employ graduate students.

GRADUATE CERTIFICATE IN EMERGENCY MANAGEMENT

The Graduate Certificate in Emergency Management at the University of North Carolina at Charlotte is designed to provide graduate education in emergency management to those individuals who are currently serving as managers in public, nonprofit, and private organizations, or those who might want to pursue a career in emergency management. The certificate is also intended to serve the interests of students enrolled in UNC Charlotte graduate programs currently. Topics of study include, but are not limited to, homeland security and terrorism, emergency prevention and response, and disaster management. The focus of the certificate is to provide the knowledge and skills necessary to manage emergency programs in the most effective, efficient, and legally sound manner.

Admission Requirements

Admission to the Graduate Certificate program in Emergency Management is open to graduates of colleges and universities accredited by a regional or general

accrediting agency. To apply, the student must meet the following requirements:

- 1) A completed Graduate Admissions application form and statement of professional goals
- 2) Two official transcripts from post secondary educational institutions
- 3) Three letters of recommendation from academic or professional sources
- 4) An overall GPA of 2.75 on a 4.0 scale

Certificate Requirements

The Graduate Certificate Program in Emergency Management requires 15 credit hours. The following courses are required:

MPAD 6290 Emergency Management
 MPAD 6291 Homeland Security
 MPAD 6292 Disaster Management
 GEOG 5190 Geographic Information Systems for Non-Majors

An additional three (3) credit hours from the following elective courses are also required:

MPAD 6141 Conflict Management in Public Organizations
 MPAD 6185 Intergovernmental Relations
 MPAD 6293 Fighting Terrorism
 GEOG 5130 Advanced Geographic Information Systems
 CJUS 5103 International Criminal Justice
 CJUS 6120 Criminal Justice Management and Decision Making
 CJUS 6132 Legal Issues in Law Enforcement
 COMM 5102 Federal Interpretation of the First Amendment
 COMM 6120 Communication and the Network Society
 PSYC 6155 Community Psychology
 ITIS 5250 Computer Forensics
 CSLG 7680 Crisis Counseling

Students may petition to take courses from other departments with approval from the MPA director. No more than three (3) credits may be transferred into the certificate program from other academic institutions.

GRADUATE CERTIFICATE IN NONPROFIT MANAGEMENT

The Graduate Certificate in Nonprofit Management at the University of North Carolina at Charlotte is designed to provide graduate education in nonprofit management for those individuals who are currently serving as managers or volunteers in nonprofit organizations, or those who might want to pursue careers in nonprofit management. The

certificate is also intended to serve the interests of students currently enrolled in UNC Charlotte graduate programs.

Admission Requirements

Admission to the Graduate Certificate program in Nonprofit Management is open to graduates of colleges and universities accredited by a regional or general accrediting agency. To apply, the student must meet the following requirements:

- 1) A completed Graduate Admissions application form and statement of professional goals
- 2) Two official transcripts from post secondary educational institutions
- 3) Three letters of recommendation from academic or professional sources
- 4) An overall GPA of 3.0 on a 4.0 scale

Certificate Requirements

The Graduate Certificate program in Nonprofit Management requires 15 credit hours. The following courses are required:

- MPAD 6310 Foundations of the Nonprofit Sector (3)
- MPAD 6311 Intro to Nonprofit Management (3)
- MPAD 6324 Financial Analysis for Government and Nonprofit Organizations (3)

An additional six credit hours from the following elective courses are also required:

- MPAD 6142 Grants and Contract Management in the Public and Nonprofit Sectors (3)
- MPAD 6327 Internal Capacity Building in Nonprofit Organizations (3)
- MPAD 6329 Nonprofit Organizations and the Environment (3)
- MPAD 6330 Program Evaluation for the Public and Nonprofit Sectors (3)
- Other electives as approved by the MPA Director and faculty

COURSES IN PUBLIC ADMINISTRATION

Arts Administration

MAAA 6001. Introduction to Arts Administration. (3) Recognizing the breadth and complexity of career options in art administration, the purpose of this class is to orient students to the basic profiles of organizational activities within the visual art field. Students will be given a broad overview of the fundamentals of administrative structure, standards of operation, and functional components that are found in various visual art organizations. They will have the opportunity to explore, discuss and understand the principles of successful art organization management. (*Fall Evening*)

MAAA 6100. Curatorial Theory and Exhibition Design. (3) This course introduces students to the evolving, diverse principles of curatorial practice and design. Topics include: research methodologies; formations, acquisitions and management of collections; and their use for aesthetic, educational and research purposes. It also examines: the roles of professionals who care for and use collections; ethics; cataloging and registration; loans; issues of interpretation to the public; and accessibility (both physical and intellectual). (*Yearly Evening*)

MAAA 6101. Performance, Culture, and Community. (3) History and problems of performing arts administration. Exploration of the gray areas between the artist and manager, between art and business. Cultural and economic contributions made to the community by strengthening the performing arts sector. Problems and opportunities particular to the performing arts in differing community, urban, or regional settings. Includes topics peculiar to administering the performing arts such as strategic planning for seasonal programming, cultural policy, legal issues, and censorship. (*Fall of alternate years*)

MAAA 6125. New Technologies for Arts Organizations. (3) This course will survey the dynamic field of current and developing technologies as they relate to the administrative aspects of an arts organization. Course content will address development of Web Sites, CD-ROMs and DVDs as well as the basics of digital imaging, image management, and video and audio technologies. Usability issues related to the World Wide Web as well as the principles of interactive and presentation design, virtual galleries and exhibition spaces together with developing technology plans will be investigated in the context of their use as methodologies for the effective implementation of new media forms. (*Alternating Years*)

MAAA 6150. Law and the Arts. (1) This course introduces students to the primary legal issues facing an arts administrator today, including some consideration of history and ethics. Topics explored include: artists' rights; freedom of expression, copyright, and trademark; cultural property (archaeological preservation, international protection of cultural heritage in war and piece, and indigenous cultures); and pressing legalities facing arts organizations. (*Alternating Years*)

MAAA 6160. Marketing for the Arts. (3) Recognizing the breadth and complexity of cultural organizations, the purpose of this class is to familiarize students with the fundamentals of marketing organizational programs and activities within the visual art field. Students will be given a broad overview of the functional components of administrative management and participation in the theory and techniques of public relations, audience development, market research, advertising and various promotional strategies. They will have the opportunity to explore, discuss and understand the principles of successful marketing for art organizations. (*Spring Evening*)

MAAA 5212. Contemporary Art Theory and Criticism. (3) This course surveys the major critical theories in recent art history and criticism of the 1980s to the present. This course demands a thoughtful, questioning, and open intellectual nature in order to be appreciated. This class will combine lecture, discussion and participation together with written assignments and exams. *(Alternating Years)*

MAAA 6311. Non-Profit Management. (3) This course examines the structure, function and administration of nonprofit organizations. Students will be taught the development of strategies to ensure successful financial and ethical management. *(Alternating Years)*

MAAA 6324. Financial Analysis for Government and Non-Profit Organizations. (3) This course will cover the topics of fund accounting basics for government and nonprofit organizations, preparation and analysis of financial statements, evaluating and monitoring financial condition, capital budgeting and investment analysis, debt policy and management. *(Alternating Years)*

MAAA 7100. Communication for the Arts. (3) Students will be given a broad overview of the functional components of administrative management and participation in the theory and techniques of both written and oral communications for internal as well as external purposes in the context of management documents, promotional materials, grant proposals, exhibition signage, press releases, oral presentation and public speaking. They will have the opportunity to explore, discuss and understand the principles of successful communications for art organizations. *(On demand)*

MAAA 7150. Education and Arts Administration. (3) This course examines the complexities involved in providing appropriate educational interpretation, content and programs for museums and other arts organizations. Recognizing that education is almost always a mission-critical aspect of public cultural organizations, students will explore how educational programming goals aid in both audience development and the artistic enrichment of the public audience. *(On demand)*

MAAA 7300. History and Theory of Art Museums. (3) This course will introduce students to the history, philosophy, practice and function of art museums. Students will research works of art and working relationships with living artists, artists' estates and both private and institutional collections. The roles and profiles of various visual art organizations both locally and nationally will be studied. *(On demand)*

MAAA 7700. Topics in Arts Administration. (1-3) This course is designed to supplement existing program studies. Topics courses provide for: 1) the offering of classes not otherwise covered by the curriculum, and incorporation of specialized topics taught by practicing professionals; such

classes offer the opportunity, as well, to explore a course's potential contribution to the overall curriculum before officially adding it to the curriculum. Samples of potential Topics courses include: Fundraising and Resource Development for Arts Administration, Managing Artists Residency Programs, Managing Public Art and Design Programs, Practical Aspects of International Art Business, and Collections Management. *(On demand)*

MAAA 7800. Internship in Arts Administration. (3) A supervised internship with a credible and functioning arts organization. The primary objective is for students to acquire a meaningful work experience in a professional institutional arts setting. The 3-credit internship is based on the student completing 120 contact hours of work in a 15 week period. Permit Only. *(Fall, Spring & Summer)*

MAAA 7990. Thesis I. (3) This course prepares the exiting MAAA student for execution of his/her Thesis, by providing students with the skills necessary to generate application-based research questions, critically evaluate research studies, construct research designs and generate viable research proposals. Projects include learning appropriate research methods; making an outline/plan; creating an annotated bibliography; and forming a thesis statement. For those students planning an exhibition, this course would include developing a curatorial strategy, designing the exhibition, planning and obtaining work to show, insurance for the work, etc. Each student is signed off by the MAAA Program Director at every stage. Permit Only *(Fall, Spring)*

MAAA 7991. Thesis II. (3) This course facilitates the execution of the preparations achieved during Thesis I, under supervision of the Program Director and other faculty/professionals on the student's Thesis Committee. If the student is pursuing a written thesis, projects include researching, writing and producing the final paper. If the student is pursuing a public exhibition, projects include executing the exhibition and public relations writing, catalog/label copy, planning panel discussions, education, outreach etc. Each student will give a public presentation of his or her project as an oral exiting requirement for the course. Permit Only *(Fall, Spring)*

MAAA 7999. Master's Degree Graduate Residency Credit. (1) As necessary, this course provides a continuous enrolment status for degree candidates during completion of thesis or other program requirements. Permit Only *(Fall, Spring, Summer)*

Public Administration

MPAD 6000. Topics for Graduate Study in Public Administration. (1-4) Intensive study of a topic in public administration. The topic of investigation may vary from semester to semester. May be repeated for credit. *(On demand) (Evening)*

MPAD 6102. Foundations in Public Administration. (3) Corequisite: Introduction to American Government (or the

equivalent). Consideration of the political context of contemporary public administration, with attention to the role of administration in the policy process, the legal basis for public administration, legislative-executive relations, and accountability and responsibility in democratic administration. *(Fall, Spring) (Evening)*

MPAD 6104. Public Organizations and Management. (3) Changing images of people, organizations and organizational environments; research findings and applications related to organization structure, motivation, leadership, communications, decision-making, group dynamics, interpersonal skills; ethics and values important to the study and practice of organizational leadership; and assessment of value systems and the impact of competing value systems on public and organizational policy making. *(Fall, Spring) (Evening)*

MPAD 6125. Research Methods for Public Administrators. (3) Pre- or Corequisite: elementary statistics or equivalent. An introduction to the application of social science research methods to problems in public management and policy. Topics include research design, measurement, data collection techniques, sampling, and decision-making theory. Includes basic introduction to the manipulation of data sets with statistical software. *(Fall, Spring) (Evening)*

MPAD 6125L. Computer Laboratory in Quantitative Research Methods in Public Administration. (1) Corequisite: MPAD 6125. Hands-on computer experience to master the substantive materials taught in Quantitative Research Methods. *(Fall, Spring) (Evening)*

MPAD 6126. Data Analysis for Decision Making. (3) Prerequisite: elementary statistics or equivalent and MPAD 6125. Continues MPAD 6125 by developing proficiency with an array of statistical procedures and tools for choosing which procedure applies to various decision making situations. Focus is on problem set up, computer-based computations, and outcome interpretation in applied settings. *(Fall, Spring) (Evening)*

MPAD 6128. Foundations of Public Policy. (3) An examination of the role of public administrators in the policy process. Topics focus on issue formation, agenda setting, decision making, implementation, and policy evaluation. Course emphasizes the role of political actors and institutional constraints in various policy arenas. *(Fall) (Evening)*

MPAD 6131. Public Budgeting and Finance. (3) An introduction to the basics of public finance and an examination of the theory and development of public budgeting, the budget processes, the budget cycle, budget reforms, capital budgets, revenue sources, taxation policies and processes, intergovernmental fiscal relations and governmental accounting practices, debt management and cash management in public organizations. *(Spring) (Evening)*

MPAD 6134. Human Resources Management. (3) Corequisite: POLS 1110, Introduction to American Government (or the equivalent). Study of the context of public personnel administration; basic functions of job evaluation and compensation, employee rights and responsibilities; the legal constraints including equal opportunity, health and safety, collective bargaining; government productivity. (Same as HADM 6147) *(Spring) (Evening)*

MPAD 6140. Labor Management Relations in Government. (3) Public employee unionization, collective bargaining, unit determination and recognition; negotiation; third-party process; administration of agreements. *(On demand) (Evening)*

MPAD 6141. Conflict Management in Public Organizations. (3) The role of the administrator as a focal point in social change and the management of the conflict that occurs. Perspectives on the negotiation and bargaining process will be reviewed. *(On demand) (Evening)*

MPAD 6142. Managing Grants and Contracts in the Public & Nonprofit Sectors. (3) Understanding government contracting and practice in government grant proposal writing with the development of contract administration skills. *(On demand) (Evening)*

MPAD 6143. Introduction to Administrative Law. (3) Prerequisite: MPAD 6102 or permission of the instructor. Examines the legal principles governing the modern administrative state, including: the Constitutional status of administrative agencies; legislative, judicial, and executive control of administrative agencies; discretion in making, adjudicating, and enforcing law and policy; the Administrative Procedures Act; and judicial review of agency action. *(On demand) (Evening)*

MPAD 6144. Changing the Public Organization. (3) Overview of concepts and methodologies of organization development, diagnosing organizational needs, change strategies and interventions. *(On demand) (Evening)*

MPAD 6160. Information Systems in Public Administration. (3) Issues involved in administering and managing information system resource activities in public organizations. Topics include the system development life cycle including issues ranging from information system design and development through installation and evaluation. Special emphasis on challenges to achieving improved performance through information technologies in the public sector. *(On demand) (Evening)*

MPAD 6170. Communication Law and Policy. (3) Cross-listed as COMM 6170. This course is designed for those students with an interest in the law of public communication. Subjects such as First Amendment theory, censorship, hate speech, libel, invasion of privacy, obscenity, indecency, and commercial speech rights will be examined.

Through a casebook and lecture approach, students will become well versed in current Constitutional law in these and other areas. No prior legal coursework is required. *(On demand) (Evening)*

MPAD 6172. Administration of the Health Care Systems in the United States. (3) Cross-listed as HADM 6100. Components of the health care system in the United States, with emphasis on the relationships among public (local, state and federal), private, voluntary and nonprofit entities; including points of access for recipients of health care; relationships with other human services and professions involved in providing health care; and the regulatory environment governing these relationships. *(On demand) (Evening)*

MPAD 6174. Public Policy and Politics in Health Care Administration. (3) Cross-listed as HADM 6142. Prerequisite: HADM 6100; MPAD 6172. Examination of the formulation, adoption and implementation of public policy for health care through federal, state and local political processes. *(On demand) (Evening)*

MPAD 6176. Trends and Issues in Health Administration. (3) Cross-listed as HADM 6204. Examination of current issues confronting health care managers and an assessment of current programs and management responses to emerging trends in the health care field, including delivery systems, marketing/competition, strategic planning, financial management and/or epidemiological changes. *(On demand) (Evening)*

MPAD 6184. Urban Politics. (3) Prerequisite: MPAD 6102 or permission of the instructor. Introduces students to urban affairs: the development of urban areas, the structures of local governmental bodies, the actors common to urban political scenes, and the incentives that motivate citizens and city officials. Illustrates urban policy issues such as poverty, race, transportation, housing, public safety, education, economic development, land-use, and service delivery. *(Spring) (Evening)*

MPAD 6185. Intergovernmental Relations. (3) Survey of the complex relationships of governments in an urban environment set in the federal system. A review of the problems created by that system and the approaches to their solutions. *(On demand) (Evening)*

MPAD 6187. Advanced Seminar in Public Management Problem Solving. (3) Seminar viewed as a capstone to the student's coursework in public management and is required to be taken by all students. Seminar devoted to topics in public management, which involve problem identification and solution. *Permit Only. (Fall, Spring) (Evening)*

MPAD 6188. Research Applications in Public Administration. (3) Prerequisite: all core courses and passing of comprehensive examination. Preparation of a major paper on a topic of significance in public or nonprofit administration. Topics must be approved by the instructor,

and paper drafts will be revised by the student following evaluation by the instructor. Each paper must be well grounded in the appropriate professional literature and must demonstrate competence in professional communication skills. *Permit Only. (Fall, Spring) (Evening)*

MPAD 6210. Aging and Public Policy. (3) Examination of the public policy making process with attention to aging policy. Consideration of determinants of aging policy and institutions and actors in the policy making process and piecemeal development of legislation will be analyzed as factors related to the making of policy for the aged. (Same as GRNT 6210) *(Yearly) (Evenings)*

MPAD 6211. Administration of Aging Programs. (3) Cross-listed as GRNT 6211. Focus will be the implementation of public policies and programs for the aged and the development and administration of these programs. Students will become familiar with the process through which policies are transformed into aging programs and the budgetary, management and evaluative considerations that must be considered. *(Yearly) (Evenings)*

MPAD 6290. Emergency Management. (3) This course focuses on the principles and practices of emergency management at the local, state, and national levels and will explore the concepts of preparedness, mitigation, response and recovery. The course will also be conducted from the perspective of emergency management's impact on local government and infrastructure, and the community's ability to prepare for, respond to, and recover from a wide array of catastrophes. *(Fall)*

MPAD 6291. Homeland Security. (3) In the wake of the events of September 11, 2001, this nation has struggled to both re-write its understanding of "security" within its borders and to re-organize its resources committed to maintaining that "security." Out of these efforts has emerged not only a new Department of Homeland Security, built from portions of more than a dozen other agencies and bureaus, but also a sense of insecurity in the American people. This course is designed to explore both of these aspects: the revamping of the bureaucracy responsible for "homeland security," and the impact on the population of this sense of uncertainty within borders. Students will examine the impact of these developments on state and local resources committed to "security" in communities, evaluating the strengths – and weaknesses – of the new "homeland security" efforts on the sub-national scale. *(Fall)*

MPAD 6292. Disaster Management. (3) Emergency managers must be prepared to face a wide variety of natural, technological and public health disasters in their communities. Having a good understanding of a potential disaster's unique characteristics and dynamics can help an emergency manager better prepare for the worst-case scenario. This course focuses on a series of natural and weather-related disasters, technological or man-made disasters and public health disasters. *(Spring)*

MPAD 6293. Fighting Terrorism. (3) This course investigates the phenomenon of the form of violence known as “terrorism”. Students will examine many facets of such violence, and the types of political violence which have existed throughout history, noting the changes which have occurred in recent years. The causes for which individuals, states and groups commit these acts, as well as the kinds of persons who have committed (or are committing) such violence will also be examined. Students will also study the strategies and tactics of both the perpetrators of terrorism and their opponents in modern administrations. Finally, students will critically analyze several regions in which terrorism has been prevalent, and the actions taken by systems to control that violence. *(On demand)*

MPAD 6310. Foundation of the Nonprofit Sector. (3) Survey of the history, culture and legal foundation of the nonprofit sector. Key definitions, scope and relationships between the nonprofit, for profit and government sectors are discussed. Examines current policy issues confronting nonprofits. *(Fall)*

MPAD 6311. Introduction to Nonprofit Management. (3) Examination of the structure, function and administration of nonprofit organizations. Developing strategies to ensure financial and ethical management. *(Spring)*

MPAD 6324. Financial Analysis for Government and Nonprofit Organizations. (3) Topics include fund accounting basics for government and nonprofit organizations, preparation and analysis of financial statements, evaluating and monitoring financial condition, capital budgeting and investment analysis, debt policy and management. *(On demand)*

MPAD 6326. Applied Economics for Public Administrators. (3) The course introduces students to the fundamental concepts of microeconomics in order to enhance their analytical skills to a level that is appropriate for practitioners in the public sector. The course will focus on how the market works, why the market results in beneficial exchanges between sellers and buyers, what effects government intervention can have upon the market, whether government intervention is necessary, and how the tools of economics can be used by public administrators to improve decision making. *(On demand)*

MPAD 6327. Internal Capacity Building in Nonprofit Organizations. (3) Development of proficiency among an array of internal management tools, including: strategic planning; volunteer recruitment, management, and retention; and program evaluation and performance measurement. *(Every other Spring)*

MPAD 6328. Urban and Community Development. (3) The course examines the policies and programs designed to reduce social and economic distress in U.S. communities and focuses on local and neighborhood-based efforts to address problems of inadequate housing, unemployment, lack of community services and facilities, crime etc. This

course also considers the various roles that government, private sector, and nonprofit organizations play in community revitalization. *(On demand)*

MPAD 6329. Nonprofit Organizations and the Environment. (3) Development of the skills needed to navigate in the complex external environment, including: fundraising, resource development, and donor development; networking, strategic alliances, and public relations; and legal requirements and issues of liability. *(Every other Fall)*

MPAD 6330. Program Evaluation for the Public and Non-Profit Sectors. (3) This course is designed to give students a comprehensive overview of the theory, concepts, methods, and tools of program evaluation. In addition to providing an overview of various types and uses of program evaluation, the course will emphasize building expertise in evaluation design, developing process and outcome measures, analyzing data, and reporting results. The course will also address the use of evaluation tools to support the development and management of programs. *(On demand)*

MPAD 6800. Directed Study in Public Administration. (3) Prerequisite: all core courses and passing of comprehensive examination. Individual project proposal on a directed topic of significance based on field experience in public administration. Pass/In Progress grading. *Permit Only. (Fall, Spring) (Evening)*

MPAD 6801. Directed Study in Public Administration. (3) Prerequisite: MPAD 6800. Individual project report on a directed topic of significance based on field experience in public administration. Pass/In Progress grading. *Permit Only. (Fall, Spring)*

MPAD 6820. Independent Study. (1-3) Prerequisite: permission of the instructor and the MPAD Director. Supervised study of a public administration topic or problem of special interest to the student, within the instructor’s expertise, and normally an extension of previous coursework with the instructor. May be repeated for credit as topics vary. *(Fall, Spring, Summer)*

MPAD 7999. Master’s Degree Graduate Residency Credit. (1) Maintains continuous enrollment as required by University policy. *(Fall, Spring, Summer) (Evenings)*

Public Policy

- **Ph.D. in Public Policy**

Public Policy Program

704-687-4520

www.uncc.edu/ppol

Director

Dr. David Swindell
Department of Political Science
3040 Colvard South

Graduate Faculty

Criminal Justice

Bruce Arrigo, Professor
Beth Bjerregaard, Associate Professor
Robert Brame, Professor
M. Lyn Exum, Assistant Professor
Paul Friday, Professor
Vivian Lord, Professor

Economics

John Gandar, Professor
Benjamin Russo, Associate Professor
Peter Schwarz, Professor
Jennifer Troyer, Associate Professor

Finance

Steven Ott, Professor

Geography and Earth Sciences

Harrison Campbell, Associate Professor
Kenneth Chilton, Assistant Professor
Owen Furuseth, Professor
Bill Graves, Assistant Professor
Edd Hauser, Professor
Gerald Ingalls, Professor
Jiyeong Lee, Assistant Professor
Tyrel Moore, Professor
Heather Smith, Associate Professor
Wei-Ning Xiang, Professor
Qingfang Wang, Assistant Professor

Public Health Sciences

Larissa Huber, Assistant Professor
Elizabeth Racine, Assistant Professor

History

Gregory Mixon, Associate Professor
Heather Thompson, Associate Professor

Management

Beth Rubin, Professor

Philosophy

Rosemarie Tong, Professor

Political Science

Theodore Arrington, Distinguished Professor
Robert Christensen, Assistant Professor
William Brandon, Distinguished Professor
Ken Godwin, Distinguished Professor
Robert Kravchuk, Professor
Martha Kropf, Assistant Professor
Suzanne Leland, Associate Professor
Tiffany Manuel, Assistant Professor
Gary Rassel, Associate Professor
David Swindell, Associate Professor

Sociology

Charles Brody, Professor
Yang Cao, Assistant Professor
Scott Fitzgerald, Assistant Professor
Rosemary Hopcroft, Associate Professor
Roslyn Mickelson, Professor
Stephanie Moller, Assistant Professor
Teresa Scheid, Professor
Murray Webster, Professor
Joseph Whitmeyer, Professor
Diane Zablotzky, Associate Professor

PH.D. IN PUBLIC POLICY

The Ph.D. in Public Policy at UNC Charlotte is an interdisciplinary program focusing on the study of policy development, implementation, and evaluation. It stresses the development of skills, tools, and specialties, as well as a theoretical understanding of them, that contribute to our understanding of the structure of institutional systems and sub-systems and of how policy should be shaped within political environments.

The Ph.D. in Public Policy at UNC Charlotte prepares students to be researchers, decision makers and policy analysts in local, state or federal governments, not-for-profit agencies, for-profit institutions, and academia. The Program stresses applied and empirical policy research grounded in an interdisciplinary theoretical foundation. Students will become versed in analytical techniques suitable for research and policy analysis to address substantive issues and problems in varied geographic and political contexts. The intellectual focus of the Program is guided by three overarching themes:

- 1) **Interdisciplinary Perspective:** Effective policy analysis and policy formation are not informed by any single discipline. Rather, public policy requires knowledge of the historical, cultural, political, institutional, geographic, and economic dimensions of policy problems facing any community.
- 2) **Applied and Empirical Policy Analysis:** Public policy is an inherently applied endeavor that seeks practical solutions and cogent analysis. While theory informs all research and analysis, the purpose of policy research is

to elevate public discourse and improve public decision-making.

- 3) Place-Based Research: To exercise applied policy analysis in an interdisciplinary context, policy research must be place-based. Real policy analysis, based on real data, applied to actual geographic and political settings is a strength of the Program.

Admission Requirements

The following are general guidelines for successful admissions into the Ph.D. in Public Policy Program:

- 7) A master's degree in a social science or other field related to policy studies is required for admission to full standing in the Ph.D. in Public Policy.
- 17) Exceptional performance at the master's level is required. This means a GPA of at least 3.3 in a master's degree program is required for admission. Students with baccalaureate degrees may be admitted on a conditional basis if they have an overall undergraduate GPA of at least 3.2 and are currently enrolled in a master's level program at UNC Charlotte in a field related to policy studies. But such students will not formally be admitted to the Ph.D. program until completion of the requirements for the master's degree.
- 18) Admission to the program will require strong scores on the verbal, quantitative, and analytic sections of the Graduate Record Examination. The Graduate Record Examination is a required part of the application package.
- 19) Three strong, positive letters of recommendation, at least two of which must come from faculty in the student's previous academic programs. All letters should be written by individuals in a position to judge the applicant's likely success in a Ph.D. level program. Letters should address the applicant's suitability for a Ph.D. program and ability to complete the program in a timely fashion. Letters from the student's master's level program are preferred.
- 20) Admission to the program of students who are not native English speakers will require strong scores on the TOEFL exam. The TOEFL exam is a required part of the application package for non-native English speakers.
- 21) Students entering the program will be expected to remedy any course work deficiencies identified by the Admissions Committee and Program Director in the first semester after enrolling in the Program. The amount and kinds of remedial course work required for the program will depend on the background of the student and will be established by the Admissions Committee and the Program Director. Possible deficiencies are indicated in the prerequisites for the required core courses of the program. However, it is

important to note that this program will emphasize the quantitative and analytical skills necessary to confront the challenges of contemporary policy dilemmas confronting communities at the local, state, federal, and international levels.

Documents to be submitted for application for admission:

- 8) Official transcripts from all colleges and universities attended
- 22) Official GRE scores (verbal, quantitative, and analytical)
- 23) The UNC Charlotte application for graduate admission form
- 24) Three letters of reference from academics who have taught or worked directly with the applicant
- 25) An essay that addresses professional goals and motivation for pursuing the degree, suitability for the program, career goals following the degree, and the policy specialty the applicant would pursue within the Program
- 26) TOEFL scores (if the student is not a native English speaker)

Admission Assessment

- 9) An Admissions Committee will review applications and recommend to the Program Director whether each applicant should be admitted and, if so, under what conditions.
- 27) The Program's Admissions Committee will assess each student's previous academic coursework in light of the student's stated direction of study. This assessment will be used to identify the strengths and weaknesses of the student's previous academic history and to suggest specific course work for the student's public policy program. Any remedial course work required for the program will depend on the student's background and will be established by the Admissions Committee and the Program Director. The Admissions Committee may also suggest specific coursework based on the student's intended direction of study within the program. The Admissions Committee will conduct this assessment upon the student's acceptance and formal declaration of intent to attend. For each entering student, a member of the Public Policy Faculty will be selected to serve as his or her major advisor for the first year in the Program before the student chooses his or her committee chair.

Student Responsibility

Students entering the program must present evidence that their background is sufficient to undertake the coursework required of them. Such evidence must include:

- 10) Familiarity with political and legal processes, behaviors, and institutions
- 28) A graduate level social science methods or statistics course
- 29) College course work in both macro- and micro-economics
- 30) Substantial background in a public policy specialty area

Students may have completed appropriate courses to provide this background elsewhere. Normally, transcripts will provide the evidence required by the Admissions Committee. However, if the student's previous experience is offered as evidence, the student must document such experience. A more detailed list of the types of prerequisite coursework can be found online at www.uncc.edu/ppol.

Admission to Candidacy Requirements

After completing the core courses, students will be required to write a qualifying examination covering the nature of the field, methodology, and economic analysis skills. After completing the qualifying examination, students take their policy field courses and then will be required to write and orally defend a comprehensive examination covering their area of policy expertise. Successful completion of both core and comprehensive examinations allows students to proceed to the dissertation proposal preparation and defense stage. Procedures for establishing the comprehensive and dissertation committees are available online at www.uncc.edu/ppol.

Assistantships

The Ph.D. in Public Policy is committed to academic year funding for all full-time students. Additional support for summer sessions may be available through research grants working with Program faculty. Available options for funding include graduate assistantships, teaching assistantships for those interested in careers in academia, and scholarships. For more information on funding options contact Dr. David Swindell, Director, Ph.D. in Public Policy.

Tuition Waivers

A limited number of out-of-state and in-state tuition waivers are available for qualified students. For full-time students with a Graduate Assistantship or Teaching Assistantship, full or partial tuition support is also available, including health insurance.

Degree Requirements

The total number of hours will be established by the student's advisor according to a plan of study that must be presented after the successful completion of 18 hours of coursework. However, the Ph.D. Program requires: 24 hours of core course credit, at least 6 hours of advanced analysis coursework, 18 hours of dissertation credit (enrollment contingent on admission to candidacy and a minimum of 15 hours credit for specialty electives. It is unlikely that students will be able to complete this degree, including mastery of a subject-matter specialty, in 65 hours; 70-75 hours is a more likely norm. Students progress through the program in five stages:

- 1) Core courses
- 2) Qualifying examination
- 3) Advanced analysis coursework and specialty policy field courses

- 4) Comprehensive examination
- 5) Dissertation

Core Courses:

The Ph.D. program requires 24 hours of core course credit.

The Nature of the Field

- PPOL 8600 Policy Process I
- PPOL 8602 Research Design
- PPOL 8635 Ethics of Public Policy
- PPOL 8690 Seminar in Public Policy*

Methods of Analysis

- PPOL 8620 Quantitative Analysis I
- PPOL 8630 Advanced Program Evaluation

Economic Analysis

- PPOL 8640 Economic Analysis I
- PPOL 8641 Economic Analysis II

*PPOL 8690 is a one credit hour course. Students must enroll in it three separate times.

Advanced Analysis Coursework

Prior to eligibility for the comprehensive examination, students must complete at least six (6) credit hours of advanced analysis coursework at the doctoral level. These credits may be taken outside the PPOL program with the approval of the Program Director. Students are encouraged to choose courses that cover the types of analysis that are prevalent in the student's policy area of interest.

Track Descriptions

In addition to completing 24 core course hours and 6 advanced analysis course hours, the student is expected to have broad knowledge of a relevant subject matter specialty. Students are required to complete a minimum of 5 classes (15 hours) in a coherent specialty area determined in cooperation with the student's advisor. The Public Policy Ph.D. program has the following specialty areas: health policy, social policy, urban regional development, criminal justice policy, and environment/infrastructure policy. A student may design a program of study with a different focus by combining classes in several of these specialty areas with the approval of the student's advisor and the Program Director. While the particular courses required in each specialty area may vary according to pre-requisites needed by the student or individual programs of study, the minimum number of required courses in any given specialty area is five (5) for 15 credit hours.

Urban Regional Development and Infrastructure

The Urban & Regional Development Policy Field stresses applied and empirical policy research that is grounded in an interdisciplinary theoretical foundation. Students will be prepared in analytical techniques suitable for research and policy analysis through courses addressing several topics at the neighborhood, city and regional levels, including: Economic Development; Transportation Policy;

Infrastructure Provision; Public Service Delivery; Growth Management; Regionalism and Governance.

Required courses for this specialty include:

- PPOL 8610 Urban Regional Environment
- PPOL 8611 Metropolitan Governance and Administration
- PPOL 8600 Transportation Policy

Two additional courses from these choices:

- PPOL 8612 Theory of Urban Development
- PPOL 8614 Colloquium in 20th Century Black Urban History
- PPOL 8615 The Restructuring City
- PPOL 8616 Urban Planning Theory and Practice
- PPOL 8617 Law and Management
- PPOL 8618 Growth Management Systems
- PPOL 8642 Regional Economic Development
- PPOL 8643 Rural Development Issues
- PPOL 8644 Public Budgeting and Financing

Health Policy

The Policy Field in Health Policy focuses on applied research in the organization, delivery and financing of health care and population-based issues in health (including mental health). A multidisciplinary faculty in epidemiology, health economics and finance, health policy, medical sociology, bioethics, and health law is ideally suited to prepare quantitative health service researchers and health policy analysts. Qualified students without a relevant Master's degree can prepare for the Ph.D. by completing coursework in the master in health administration (MHA), the MA in medical sociology, or the MS in Health Promotion while enrolled in the Ph.D. with a field specialty in Health Policy.

Required courses for this specialty include:

- PPOL 8661 Social Organization of Health Care
- PPOL 8663 Health Policy
- PPOL 8665 Analytic Epidemiology
- PPOL 8667 Economics of Health and Health Care
- PPOL 8669 Investigating Health and Health Services

Justice Policy

The Justice Policy Field provides an interdisciplinary approach to the study of crime and society's response to it. This concentration prepares students to conduct research and policy analysis on local, state, and national policies and policy initiatives and provide information for policy makers. The primary goal of this specialization is to provide students with the tools necessary for critically and objectively assessing policies related to the administration of justice. Toward that end, students gain the appropriate analytical skills, an understanding of the nature of criminal behavior and its impact, and knowledge about the criminal justice system as well as about a variety of issues related to the control of crime. They also become familiar with the process of making and implementing justice policy and with those organizations involved in this process.

Required courses for this specialty include:

- PPOL 8671 Criminal Justice Policy
- PPOL 8672 Theories of Crime and Justice
- PPOL 8673 Law and Social Control
- PPOL 8681 Race, Gender, Class and Public Policy
- One other course from the other Policy Fields

Social Policy

The Policy Field in Social Policy prepares scholars, researchers, practitioners, and policy makers to address crucial social issues facing communities and our nation including social welfare, education, poverty, housing and homelessness and the role of public, nonprofit, and private sectors in alleviating and contributing to such problems. In addition to dealing with these topics in their own right, the social policy field focuses on the complex interrelationships among these issues and the manner in which they are influenced by--and in turn influence--prevailing patterns of racial, ethnic, and gender stratification. The social policy specialization provides the theoretical background, methodological training, and substantive knowledge that will allow students to make important contributions to the development, implementation, and evaluation of public policies addressing the most vexing and important social issues of our time.

Required courses for this specialty include:

- PPOL 8681 Race, Gender, Class and Public Policy
- PPOL 8682 Stratification and Social Policy
- PPOL 8683 Population Dynamics and Social Policy

Two additional courses from these choices:

- PPOL 8685 Aging and Social Policy
- PPOL 8687 Education Policy
- PPOL 8688 Political Economy & School Reform
- PPOL 8689 The Social Context of Schooling

Environmental/Infrastructure Policy

The Policy Field in Environmental/Infrastructure Policy focuses on environmental issues impacted by energy production and consumption, growth, pollution, and population change. This specialty allows interested students to gain knowledge on the economic factors related to environmental degradation and improvement. It also allows them the opportunity to become familiar with the scientific aspects of urban air, water, and earth systems. Policy making and policy analysis related to these issues will all be covered by courses in this specialty.

Required courses for this specialty include:

- PPOL 8600 Transportation Policy
- PPOL 8650 Environmental Policy
- PPOL 8652 Energy and Environmental Economics

Two additional courses from these choices:

- PPOL 8653 Urban Air Quality
- PPOL 8655 Watershed Science and Policy
- PPOL 8656 Earth Systems Analysis: Biogeochemical cycles

Students may also develop a focus in other related fields or design their specialty based on faculty resources available. As with all programs, such a program would need the approval of the student's advisor and the Director of the Program. Program faculty will continue to develop additional substantive and methods courses.

Advising/Committees

Students will be assigned to an advisor soon after enrolling in the Program and will work closely with that advisor on suggested schedules of classes, research options, and other issues important to success. A peer advisor will also be assigned to each incoming student from among more senior students to aid in the early stages of integration into the Program. After approximately one year in the program, each student is expected to have identified a faculty member with they would like to mentor, with the expectation that this mentor would ultimately serve on the students committees. Following completion of the policy field courses, students establish the comprehensive examination committee. Following completion of the comprehensive examinations, students will choose a dissertation advisor and form a dissertation committee. The procedures for establishing these committees are available online at www.uncc.edu/ppol.

Grades Required

A student must maintain a cumulative average of 3.0 in all course work taken for graduate credit. An accumulation of two C grades will result in termination of the student's enrollment in the graduate program. If a student receives a grade of U in any course, enrollment in the program will be terminated.

Transfer Credit

The Program will accept up to two courses in the core curriculum as transfer credit from other regionally accredited doctoral institutions, providing that the Admissions Committee determines that these courses are equivalent to those offered in the core or one of the specialty areas. The acceptance of transfer credit is subject to the approval of the Graduate School. The grade in these transfer credits must have been A or B. All of the dissertation work must be completed at UNC Charlotte.

Language Requirement

There is no foreign language requirement.

Dissertation

The program requires that the student complete 18 hours of dissertation credit. Enrollment in dissertation credit is contingent on admission to candidacy. The dissertation topic may be proposed after the student has passed the comprehensive exams. The doctoral student advances to candidacy after the dissertation proposal has been defended to, and approved by, the student's advisory committee and reported to the Director of the Ph.D. in Public Policy and the Dean of the Graduate School. The student must complete and defend the dissertation based on a research

program approved by the student's dissertation committee that results in a high quality, original, and substantial piece of research.

Other Requirements

PPOL 8690 Public Policy Seminar Series. Students in the Program will develop their appreciation of the varied nature of policy applications and improve their communication skills by participating in at least three seminar series throughout the course of their program. Each term, a series of guest speakers will prepare monthly seminars reflecting a range of policy issues and challenges. Students engage in activities aimed at professional development for both practitioners and for those interested in pursuing careers in academia.

Research Opportunities

The Ph.D. Program in Public Policy has an extensive pool of professors to enhance the research opportunities and experiences for the students. Each program of study could be individually tailored for the research of the student with the possibility of individual studies under the supervision of an advisor.

Application for Degree

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar. After successful defense of the dissertation, a student will be conferred with the doctoral degree.

Residency Requirement

Students must satisfy the residency requirement for the program by completing 21 hours of continuous enrollment, either as course work or dissertation credits. Residence is considered continuous if the student is enrolled in one or more courses in successive semesters until 21 hours are earned. All 18 hours of dissertation credit must be earned at UNC Charlotte.

Time Limits for Completion

The student must achieve admission to candidacy within six years after admission to the program. All requirements for the degree must be completed within eight years after first registration as a doctoral student. These time limits are maximums; full-time students will typically complete the degree requirements in five years.

COURSES IN PUBLIC POLICY

Notes:

- 11) *The core courses listed below are available only to students admitted into the Ph.D. in Public Policy or to students admitted to other Ph.D. programs.*
- 31) *Permission of the instructor is required on all classes in the Public Policy Ph.D.*

- 32) *There are no specific prerequisites for many of the courses listed below; however, the general levels of preparation are described in greater detail on the program's website.*
- 33) *Many of these courses will be offered during one of the summer sessions as well as during the semester specified in the course description.*
- 34) *Changes to the core or the specialty area courses can be found online at www.uncc.edu/ppol or www.uncc.edu/gradmiss.*

PPOL 8000. Topics in Public Policy. (1-4) Prerequisites: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Study of selected topics in Public Policy. Maybe repeated for credit. *(On demand)*

PPOL 8600. Policy Process I. (3) Prerequisites: Prior course work or experience relevant to political and legal processes, behaviors, and institutions. Examination of the field of public policy analysis to include both theory and practice. Process includes everything from sources of public problems to feedback mechanisms after policy implementation. Emphasis on the policy process in growing urban regions and the ability to communicate with stakeholders to determine value conflicts and to communicate policy solutions. Examination of the context (legal, institutional, historical, philosophical, social, political, physical and spatial) within which policy is made with sensitivity to gender, race and ethnicity, and class concerns. *(Fall)*

PPOL 8601. Policy Process II. (3) Prerequisite: PPOL 8600. Continuation of Policy Process I. Includes more specific application of theory to specific public problems in a variety of specialties, and the variation in communication problems that arise in these sub-systems. Emphasis on interaction of all aspects of urban regions, which produce public problems and determine which policies will be acceptable and effective. *(Spring)*

PPOL 8602. Research Design in Public Policy. (3) Introduces students to various quantitative and qualitative approaches to doing policy research. Considers such major issues in philosophy of science as causality, measurement, and post-positive approaches to research. Students may use the course to prepare their dissertation proposals or research grant and contract proposals. Students should have completed at least two quantitative analysis courses and one qualitative analysis course before registering for PPOI 8602. *(Spring)*

PPOL 8610. Urban Regional Environment. (3) Cross-listed as GEOG 6123 and 8123. Prerequisite: Prior course work or experience relevant to the nature of urban regions. Examination of the nature of urban regions. The basic factors that shape urban regions as they grow. Impact of: geography; history; social factors; economic factors; concerns about gender, race and ethnicity, and class; and other determinants of the nature of urban regions, their problems, and possible policy solutions. *(Fall)*

PPOL 8611. Metropolitan governance and administration. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Introduction of major issues in urban politics and related trends and problems in urban governance and administration. *(Spring)*

PPOL 8612. Theory of Urban Development. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Analysis of urban economics and politics within the context of public policy and planning. Focuses on theory and application to understand the rationale for and effects of urban policy, urban economic development, and planning. Provides basic understanding of the operation of urban real estate markets and the motivation for public sector interventions. Applies theoretical foundations to the study of current urban problems and controversies. Familiarity with introductory microeconomics is required. *(Fall)*

PPOL 8613. Transportation Policy. (3) Cross-listed as GEOG 6600 and 8600. Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the instructor. This course examines surface transportation from a broad public policy perspective with a special focus on its institutional components and the changing role of government in transportation policy-making including the evolution of, and relationships among, various federal, state and local policies that affect investment decisions in transportation infrastructure. *(On demand)*

PPOL 8614. Colloquium in 20th Century Black Urban History. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Examination of major and topical monographic works in African-American urban history during the twentieth century. The focus will be on such topics as "classical urban examinations by black scholars, ghettoization and alternative theories, community and its institutions, riot and urban rebellions, biography, black mayors, and urban policy. *(Fall as needed)*

PPOL 8615. The Restructuring City. (3) Cross-listed as GEOG 6210 and 8210. Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course places at center stage the causes and consequences of contemporary urban restructuring and evaluates the theoretical, planning, and policy challenges inevitably presented. *(Spring)*

PPOL 8616. Urban Planning Theory and Practice. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Alternative planning theories and application of theories in urban planning practices. *(Alternate years)*

PPOL 8617. Law and Management. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Constitutional and administrative law issues, including a survey of academic

debates over contested issues, and selected areas in constitutional law on civil liberties and civil rights. *(Spring)*

PPOL 8618. Growth Management Systems. (3)
Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Exploration of growth management programs, legal and planning issues, and legislation to determine their merits, weaknesses and abilities to promote more sustainable development patterns. Will emphasize difficulty of changing traditional procedures of development and land use. *(On demand)*

PPOL 8620. Quantitative Methods in Public Policy I. (3)
Prerequisite: graduate level social science methods or statistics course. Advanced quantitative methods as applied to analysis and solution of public problems. Use of quantitative methods to analyze public problems; devise appropriate, effective, acceptable public policies; evaluate public programs; and present the results of quantitative analysis to appropriate audiences. *(Fall)*

PPOL 8621. Quantitative Methods in Public Policy II. (3) Prerequisite: PPOL 8620. Advanced quantitative methods as applied to analysis and solution of public problems. Use of quantitative methods to analyze public problems, devise appropriate, effective, and acceptable public policies; to evaluate public programs; and to present the results of quantitative analysis to appropriate audiences. *(On demand)*

PPOL 8622. Quantitative Methods in Public Policy III. (3) Advanced quantitative methods as applied to analysis and solution of public problems. Use of quantitative methods to analyze public problems, devise appropriate, effective, and acceptable public policies; to evaluate public programs; and to present the results of quantitative analysis to appropriate audiences. *(On demand)*

PPOL 8625. Advanced Seminar in Spatial Decisions Support Systems. (3) Cross-listed as GEOG 8625.
Prerequisite: GEOG 5120 or permission of the Instructor. Theoretical aspects of spatial DSS including technical, social, political and psychological considerations; system s design; systems manipulation; and case studies. Three hours of lecture and one-two hour lab per week. *(Fall)*

PPOL 8630. Advanced Program Evaluation. (3)
Development and application of policy analysis to the evaluation of existing public policies. Particular attention to the use of multiple techniques of analysis and presentation of program evaluations to relevant audiences. *(Fall)*

PPOL 8635. Ethics of Public Policy. (3) Ethical questions in the study, formation, implementation, and evaluation of public policies. Ethical dilemmas faced by the public policy analyst, and the importance of use of values analysis. Emphasis on understanding how values are communicated by a variety of stakeholders in policy systems and how communicating public policy solutions involves an

understanding of the role of values in successful policy formation and implementation. *(Spring)*

PPOL 8636. The Social Context of Mental Health. (3)
Cross-listed as SOCY 6635, SOWK 6635, and PSYC 8636.
Prerequisite: Admission to graduate program or permission of instructor. This course draws upon contributions from the field of psychiatry, psychology, social work, and anthropology. The focus is on mental health and illness it is social context, with an emphasis on the relationship between social structure and mental health/disorder. We will examine the social factors which shape psychiatric diagnosis, the effects of socio-demographic variables on mental health, and the role of social support and stress for different groups. The course also examines the organization, delivery, and evaluation of mental health services, and mental health care policy. *(Every other year)*

PPOL 8640. Economic Analysis of Public Policy I. (3)
Economic role of government, efficiency versus equity, externalities, and public goods, market failures and government failures, economics of centralized versus decentralized decision making, public choice theory, economics of privatization, economic role of non-profits and non-governmental organizations. *(Fall)*

PPOL 8641. Economic Analysis of Public Policy II. (3)
Prerequisite: PPOL 8640. Economics of taxation and government borrowing, benefit-cost analysis, regional growth and development, econometric analysis of local and regional public policy issues. *(Spring)*

PPOL 8642. Regional Economic Development. (3) Cross-listed as GEOG 6302 and 8302. Prerequisite: Full graduate standing in the Ph.D. in Public Policy; PPOL 8610; Intermediate microeconomics; or permission of the Instructor. Course covers classical, neo-classical and contemporary theories of trade, economic geography, and regional development. Topics include theories of urban and regional growth, location theories, human capital, labor force and entrepreneurial contributions to growth. Policy dimensions of urban growth and development are addressed from theoretical and empirical perspectives. *(Fall)*

PPOL 8643. Rural Development Issues. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course provides research experiences that focus on policy formulation, and demographic, economic and planning issues in rural areas. *(Fall)*

PPOL 8644. Public Budgeting and Financing. (3)
Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Focus is on the public budget process as a means of policy development, analysis and implementation. It will also address in more depth issues of financing the policies authorized in the budget and for which appropriations are sought. *(Spring)*

PPOL 8650. Environmental Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course draws upon concepts and tools from economics, geography, law, sociology, political science, and planning to explore the concept of sustainable development, a central tenet of environmental policy. Environmental policy will be analyzed within the federalist framework. *(On demand)*

PPOL 8652. Energy and Environmental Economics. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Economics issues of both energy and environment. Energy issues include the historical development of energy resources, supply and demand considerations, and projections of the future energy balance. Environmental issues are externalities, common property resources, and government regulation. Policy considerations include environmental standards, pollution charges, and property rights. Cost-benefit analysis and microeconomic theory are applied. *(On demand)*

PPOL 8653. Urban Air Quality. (3) Prerequisites: Ph.D. student and permission of instructor. Examination of the relationships between climatic processes and urban air quality with emphasis on trends and patterns. Topics will include health and environmental effects of air pollution, ozone climatology, pollutant transport, transportation related emissions, risk assessment, and air quality management. *(Fall)*

PPOL 8655. Watershed Science Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Examination of the cycling of water and chemical elements within forested, agricultural and urbanized watersheds. Land use regulations designed to protect water quality are examined with respect to hydrologic and biogeochemical process that operate at the watershed scale. *(On demand)*

PPOL 8656. Earth Systems Analysis: Biogeochemical Cycles. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course examines the Earth's water and major elemental cycles including those of carbon, nitrogen, sulfur, phosphorus and the major crustal elements. Uncertainties in the current state of global elemental cycles are examined. Special emphasis is placed on how these cycles are currently being modified through human activities. *(On demand)*

PPOL 8661. Social Organization of Health Care. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Focuses on the structures and operations of health care institutions and providers. The topics covered include the socio-historical development of the existing health care system, health care occupations and professions, professional power and autonomy, professional socialization, inter-professional and provider-client relations, health care organizations, and how change affects the delivery of health care services. *(Summer)*

PPOL 8663. Health Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy and a graduate level course providing an adequate introduction to the U.S. health care system such as HADM 6112, MPAD 6172, HPKD 8112 or permission of the Instructor. This doctoral seminar examines the formulation, adoption, implementation, and evaluation of health policy at national, state, and local levels through extensive readings in relevant health and policy literatures. *(Spring)*

PPOL 8665. Analytic Epidemiology. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy and a graduate level courses such as HPKD 6189 and HADM 6103 or permission of the Instructor. Principles and methods of studying advanced epidemiology, with emphasis on analytical approach. Includes advanced techniques in the establishment of disease causation in groups and communities. Such topics as risk assessment, environmental exposures, stratification and adjustment, and multivariate analysis in epidemiology are covered. *(Fall)*

PPOL 8667. Economic of Health and Health Care. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy, PPOL 8640 and PPOL 8641 or permission of the Instructor. This course will use economic theory and econometrics to analyze the functioning of the health care sector and appropriate public policy. Topics will include: how markets for medical care differs from other markets, the demand for medical care, the demand and supply of health insurance, the role of competition in medical markets, managed care, managed competition, and the role of the public sector in regulating and financing health care. *(Fall)*

PPOL 8669. Investigating Health and Health Services. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy and PPOL 8620 and PPOL 8621 or permission of the Instructor. The emphasis of this course is how to conduct and evaluate research necessary to health policy. Students will be expected to conduct research utilizing a variety of methodologies and will also learn how to access available secondary data sets relevant to health care and policy. The specific topics include: multidisciplinary collaboration, measurement of health related constructs and health care outcomes, and health evaluation (cost, quality, access). Students will be expected to develop their dissertation proposals as one outcomes of this class. This class is designed to be a seminar, and active participation in class discussion and activities is essential. *(Fall)*

PPOL 8671. Criminal Justice. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Examination of the criminal justice subsystems (law enforcement, courts, corrections) with particular focus on the development of policy and the effectiveness of current policies aimed at reducing crime. *(Fall)*

PPOL 8672. Theories of Crime and Justice. (3) Prerequisite: Full graduate standing in the Ph.D. in Public

Policy or permission of the Instructor. This course is designed to expose students to mainstream and critical theoretical approaches to crime, justice, and criminal behavior. An emphasis on both broad conceptual orientations allows us to assess the development of criminology within an array of historical and philosophical contexts during the past three centuries. *(On demand)*

PPOL 8673. Law and Social Control. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Examines how the criminal law functions as a powerful tool of social control in our society. Particular emphasis is given to understanding the constitutional limitations placed on construction of law, the elements of criminal offenses, and criminal defenses. *(Spring)*

PPOL 8681. Race, Gender, Class and Public Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course is designed as an overview of major theories, trends and debates on the topic of gender, race and economic inequality in the contemporary United States. *(On demand)*

PPOL 8682. Stratification and Social Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course examines (a) structures and processes underlying social stratification in the United States, particularly the inequality that is grounded in social class, gender, ethnicity, and race; and (b) the social policy implications that follow from our analysis of the nature and sources of stratification. *(On demand)*

PPOL 8683. Population Dynamics and Social Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. Basic population characteristics, such as age distribution, life expectancy, fertility, and trends in these characteristics are relevant to nearly all social policy. This class is an introduction to basic concepts and tools of demographic analysis and how they may be applied to the study of social policy including family policy, aging policy, and minority groups' policy. *(On demand)*

PPOL 8685. Aging and Social Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course is designed to utilize the concepts of social gerontology as a Springboard for examining social policy for an aging population. Examination of the public policy making process with attention to aging policy. Consideration of determinants of aging policy and institution and actors in the policy making process and piecemeal development of legislation will be analyzed as factors related to the making of policy for the aged. *(On demand)*

PPOL 8687. Education Policy. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course examines equity, efficiency, and diversity tradeoffs among alternatives systems

of delivering K-12 education. The course also examines how to evaluate educational policies and programs. *(On demand)*

PPOL 8688. Political Economy of School Reform. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. This course examines between business leaders' vision for school reform and the school restructuring movement, the reforms which arise from their construction of the problem, local educational restructuring efforts within the context of the larger national reform movement, and the opportunities and dangers of corporate-inspired educational policies. *(On demand)*

PPOL 8689. The Social Context of Schooling. (3) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the Instructor. The purpose of this course is to examine the relationships among certain aspects of the contemporary social structure and educational processes and outcomes. It explores the ways that the social class structure, race, and gender stratification affect the ways individuals experience, understand, and acquire education. *(On demand)*

PPOL 8690. Seminar in Public Policy. (1) Prerequisite: Full graduate standing in the Ph.D. in Public Policy or permission of the instructor. Series of guest speakers and exercises on a range of policy issues. Designed to increase familiarity with the variety of topics and methods covered by policy making and analysis as well as career options. Student participation and oral critique of a selected speaker and their topic. Must be repeated for a total of 3 credit hours. *(Fall, Spring)*

PPOL 8800. Independent Study. (1-3) Prerequisite: permission of the instructor and the PPOL Director. Supervised study of a public policy topic or problem of special interest to the student and within the instructor's expertise. May be repeated for credit. *(Fall, Spring, Summer)*

PPOL 8801. Dissertation. (1-9) Prerequisite: passage of qualifying examinations, and approval of dissertation topic by the student's advisory committee. In-depth study of a practical problem in public policy. Analysis of the problem, preparation of a policy solution, and presentation of the solution to appropriate stakeholders and the public. Pass/unsatisfactory grading. Maximum of 18 hours allowed under this course designation. *(Fall, Spring, Summer)*

PPOL 8802. Dissertation Residence. (1) Prerequisite: completed enrollment in 18 hours of dissertation with grade of IP, In Progress. This course is to allow a student who has taken all permissible 18 hours of dissertation to remain in residence to finish work on the dissertation. Pass/unsatisfactory grading. Credit for this course does not count toward the degree. *(Fall, Spring)*

PPOL 9999. Doctoral Degree Graduate Residency Credit. (1)

Religious Studies

• M.A. in Religious Studies

Department of Religious Studies

210 Macy
(704) 687-4598
www.religiousstudies.uncc.edu

Coordinator

Dr. John C. Reeves

Graduate Faculty

Kent Brintnall, Assistant Professor
Juliane Hammer, Assistant Professor
Kathryn Johnson, Associate Professor
Sean McCloud, Associate Professor
David Mozina, Assistant Professor
John C. Reeves, Professor
Joanne Maguire Robinson, Associate Professor
Julia Robinson-Harmon, Assistant Professor
Jeremy Schott, Assistant Professor
James D. Tabor, Professor
J. Daniel White, Associate Professor

MASTER OF ARTS IN RELIGIOUS STUDIES

The program approaches the academic study of religion and religions from a variety of critical and interdisciplinary perspectives, with an emphasis placed on the global and multicultural aspects of religion. The department offers courses in Asian, Middle Eastern, European, and American religious traditions which focus on aspects of both their historical and contemporary manifestations.

Additional Admission Requirements

In addition to meeting the university's graduate admission requirements, all prospective students must submit an essay (statement of purpose) that specifically addresses their motivation for pursuing the M.A. in Religious Studies, including some discussion of their research interests and career or professional goals. Standardized test scores and letters of reference can be no more than five years old.

Degree Requirements

The Master of Arts in Religious Studies requires the completion, with a GPA of 3.0 or better, of a minimum of 30 semester hours of approved graduate course work. At least 15 hours of this total must be in courses open only to

graduate students (i.e., at the 6000 level or higher). Upon the completion of 24 hours of course work, students must pass a comprehensive written examination based on their studies. Students have the option of writing a thesis (6 semester hours credit) or of compiling a portfolio of selected research papers written for courses in the program (no additional credit). In either case the candidates must pass an oral examination based on their thesis or writing portfolio. Students completing a thesis may take 6 hours of thesis preparation (RELS 6999) toward their 30 hours. All degree requirements, including the comprehensive examination, thesis or portfolio, and oral defense, must be completed within six calendar years of first enrollment in the program.

Core Courses

All M.A. candidates must complete RELS 6101 (Approaches to the Study of Religion) with a grade of B (3.0) or better within three semesters of their initial admission into the program.

Elective Courses

Up to 6 semester hours of related graduate credit may be earned outside the Department of Religious Studies. Such courses must be formally approved by the director of graduate studies.

Admission to Candidacy Requirements

An Admission to Candidacy form is normally filed upon the completion of 24 hours of course work.

Advising

The director of graduate studies serves as formal advisor to the graduate students.

Transfer Credit

Up to 6 semester hours earned from other accredited institutions may be eligible for transfer credit. Formal approval must be obtained from the director of graduate studies and the Dean of the Graduate School.

Language Requirement

Although students are not required to demonstrate proficiency in a foreign language as a formal matriculation requirement of the program, they are expected to acquire competency in and use whatever languages they need to pursue their research interests.

Comprehensive Examination

Every student must satisfactorily complete a comprehensive written examination upon the conclusion of their coursework. This examination is normally taken during the third or fourth semester (for full-time students). Students who elect to write a thesis become eligible for the comprehensive examination after completing 24 hours of course work; all others become eligible after completing 30 hours of course work.

Committees

Three-member faculty committees, consisting of two graduate faculty members from the Department of Religious Studies and a third member selected from Religious Studies or another department, conduct the comprehensive examinations and oversee the student's thesis work.

Thesis

Students have the option of writing a thesis (6 semester hours credit) or of compiling a portfolio of selected research papers written for courses in the program (no additional credit). In either case the candidates must complete an oral examination based on their thesis or writing portfolio.

Application for Degree

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

COURSES IN RELIGIOUS STUDIES

Enrollment in RELS courses numbered 6000 and higher is open to students by permit only.

RELS 5000. Topics in Religious Studies. (3) Prerequisite: permission of the instructor. May be repeated for credit. *(On demand)*

RELS 5010. Major Figure in Religious Studies. (3) The life and works of a major figure who has contributed to religious studies. May be repeated for credit for different figures. *(On demand)*

RELS 5101. Religion and Modern Thought. (3) The interaction of modern thought and modern religious sensibilities. *(Alternate years)*

RELS 5107. Early Judaism. (3) Prerequisite: RELS 2104 or 2105 or 3110 or permission of the instructor. Comparative historical and literary study of the varieties of Judaism evidenced during late antiquity (circa 70-640 C.E.), with special attention devoted to the formation and development of rabbinic Judaism. *(On demand)*

RELS 5108. Medieval Judaism. (3) Prerequisite: RELS 2104 or 3110 or permission of the instructor. Comparative historical and literary study of the varieties of Judaism evidenced in Western Europe, the Byzantine Empire, and Islamicate realms from approximately 640 C.E. to approximately 1492 C.E. *(On demand)*

RELS 5109. Modern Judaism. (3) Prerequisites: RELS 3110 or 4107 or 4108 or permission of the instructor. Historical and conceptual study of Judaism and Jewish experience in Europe, America, and Israel, from the 16th century to the present, with special attention paid to the development of denominations, Zionism, and the Holocaust. *(On demand)*

RELS 5110. Contemporary Jewish Thought. (3) An examination of philosophy, religion, morality, politics, sociality, culture, family, and self-identity, in the light of modern and recent Jewish thought. *(Alternate years)*

RELS 5201. Religion, Morality, and Justice. (3) Explores the ethical and social dimensions of selected religious traditions in their cultural contexts. *(On demand)*

RELS 6000. Topics in Religious Studies. (3) Prerequisite: permission of the instructor. May be repeated for credit. *(On demand)*

RELS 6101. Approaches to the Study of Religion. (3) This course provides students with critical tools for research, analytical thinking, and writing in the academic study of religion. The topics and individuals this course covers represent several major currents of thought in the field of religious studies. *(Fall)*

RELS 6103. Material Christianity. (3) Explores the ways in which individuals and societies throughout the Christian tradition have invested material objects with sanctity and power. *(Alternate years)*

RELS 6104. Religion and Art in Islam. (3) Explores the relationships between Islamic thought and the development of Islamic art and architecture. *(Alternate years)*

RELS 6105. Religion, Art and Architecture of East Asia. (3) A study of the religious ideas in physical forms in the cultures of China and Japan. The course focuses on the Confucian, Daoist, and Buddhist traditions. *(Alternate years)*

RELS 6111. Qumran and its Literature. (3) A study of the manuscripts recovered from the caves of Qumran. Attention given to their connections to Second Temple Judaism, early Christianity, and later developments in Islam. *(Alternate years)*

RELS 6602. Seminar in the Religion of Ancient Israel. (3) Current and seminal issues related to the study of the religion of ancient Israel. A general theme will be chosen which at times will be keyed to the pertinent archaeological evidence available for evaluating the complex scope of Israelite religiosity, but which at other times may selectively focus on narratological descriptions of religious behavior (e.g., the religious ideology of Deuteronomy). Extensive attention will be devoted to the comparative study of Israelite religion within its ancient Near Eastern context. May be repeated as topics vary. *(On demand)*

RELS 6603. Seminar in Early Judaism. (3) Current and seminal issues related to the historical-critical study of early Judaism and its literature. A general theme will be chosen: a narrative source (Mishnah, Midrash, Talmud); a subdivision of texts (Jewish apocrypha and pseudepigrapha) or literary genres (apocalyptic literature); a single ancient text (1 Enoch; Avot de R. Natan); or a topical investigation

(written and oral Torah; construction of authority in rabbinic Judaism; sectarian disputes within early Judaism; cultural impact of the Roman destruction of the Temple). May be repeated as topics vary. (*On demand*)

RELS 6612. Seminar in Christian Origins. (3) Current and seminal issues related to the historical-critical study of the origins and development of earliest Christianity. A general theme will be chosen; an historical figure (John the Baptist, Jesus, Paul, James); an ancient text (a New Testament document; Gospel of Thomas; the Gnostic Nag Hammadi codices); or a topical investigation (Jesus and the Dead Sea Scrolls; the development of early Christian liturgy; the development of early Christian Christology; ancient Judaism and emerging Christianity). May be repeated as topics vary. (*On demand*)

RELS 6615. Seminar in the Religions of Late Antiquity. (3) Current and seminal issues related to the academic study of one or more of the religions practiced in the Roman and/or Sasanian Empires during late antiquity. A general theme will be chosen that may center upon one or more specific religious identities or trajectories; one or more textual traditions; an influential figure or interpretive school; or a topical investigation. May be repeated for credit as topics vary. (*On demand*)

RELS 6622. Seminar in Religion and Modern Culture. (3) A seminar on issues related to the historical-critical study of the interaction between religion and modern culture. One or more general themes will be chosen: leading theorists, appropriate historical contexts, global contexts, or a topical investigation. May be repeated as topics vary. (*On demand*)

RELS 6625. Seminar in American Religions. (3) Current and seminal issues related to the academic study of one or more of the religions of North America. A general theme will be chosen that may center upon one or more specific religious traditions; an important individual figure or character; an historical period or epoch; or a topical investigation. May be repeated for credit as topics vary. (*On demand*)

RELS 6631. Seminar in Islamic Studies. (3) Current and seminal issues related to the academic study of Islam. A general theme will be chosen that may center upon one or more schools of thought; an important individual figure or character; one or more textual sources or literary genres; an historical period or epoch; or a topical investigation. May be repeated for credit as topics vary. (*Yearly*)

RELS 6641. Seminar in Asian Religions. (3) Current and seminal issues related to the academic study of one or more of the religions of South and/or East Asia. A general theme will be chosen that may center upon one or more specific religious traditions; an important individual figure or character; one or more textual sources or literary genres; an historical period or epoch; or a topical investigation. May be repeated for credit as topics vary. (*Yearly*)

RELS 6651. Seminar in the History of Religions. (3) Current and seminal issues related to the academic study of one or more of the interpretive categories or concepts associated with the practice and expression of religion(s). A general theme will be chosen that may center upon a specific interpretive category or concept; an influential scholar or school of interpretation; a prominent historical period or cultural movement; or a topical investigation. May be repeated for credit as topics vary. (*Yearly*)

RELS 6671. Seminar in Theory and Methods. (3) Current and seminal issues related to contemporary theory and cultural studies and their import for the academic study of religion(s). A general theme will be chosen that may center one or more specific theories or methods; an influential thinker or school of thought; an historical period or cultural movement; or a topical investigation. May be repeated for credit as topics vary. (*Yearly*)

RELS 6800. Directed Readings/Research. (1-3)
Prerequisite: prior written permission of instructor. May be repeated for credit as topics vary. (*Fall, Spring*)

RELS 6999. Thesis. (3 or 6) May be repeated by permission, if taken for three hours credit. Six hours of Thesis may be taken during a single semester. Appropriate research and written exposition of that research is required. (*On demand*)

RELS 7999. Master's Degree Graduate Residency Credit. (1) (*Fall, Spring, Summer*)

Sociology

- **M.A. in Sociology**

Department of Sociology

476 Fretwell
704-687-2252
<http://sociology.uncc.edu/graduate.html>

Director

Beth A. Rubin, Professor

Graduate Faculty

Judy R. Aulette, Associate Professor
Charles J. Brody, Professor
Yang Cao, Associate Professor
Scott Fitzgerald, Assistant Professor
Rosemary L. Hopcroft, Associate Professor
Larry M. Lance, Associate Professor
Noah Mark, Assistant Professor
Julie McLaughlin, Assistant Professor
Roslyn Mickelson, Professor

Stephanie Moller-Smith, Assistant Professor
 Lisa S. Rashotte, Associate Professor and Chair
 Teresa L. Scheid, Professor
 Elizabeth Stearns, Assistant Professor
 Murray Webster, Jr., Professor
 Joseph M. Whitmeyer, Professor
 Diane Zablotzky, Associate Professor
 Wei Zhao, Assistant Professor

MASTER OF ARTS IN SOCIOLOGY

The Master of Arts in Sociology degree program provides students with skills for analysis of social phenomena, from contemporary social problems to theoretical issues. Training concentrates on research design, data analysis, interpretation and application of sociological theory, and core substantive areas of sociology. As culmination, students complete either a thesis or, with a more applied focus, a research practicum.

Program of Study

The M.A. curriculum is designed to meet the needs of students seeking master's level research skills for occupations requiring such expertise: in government, marketing, program planning and evaluation, business, the media, and the non-profit sector. The curriculum also prepares students who wish to pursue the Ph.D., whether in sociology or a related discipline (such as public policy or criminology). Coursework in the program concentrates on building skills in research design, data analysis and interpretation and application of sociological theory. Students complete either a thesis, with oral defense, or a research practicum. Either option entails the student applying sociological knowledge to a problem/topic of his/her interest.

Additional Admission Requirements

- 1) An overall undergraduate GPA of 3.0 or better
- 2) An acceptable score on the Graduate Record Examination (GRE)
- 3) Demonstrated undergraduate competence in research methods, theory and statistics for social research.
- 4) Eighteen credit hours of social science undergraduate courses.

Prerequisite Requirements

Research Methods, Theory, Statistics for Social Research

Degree Requirements

The program requires 35 semester hours of coursework. To provide all students with a solid grounding in theory and methods of sociological inquiry, 12 hours of core courses are required (Pro-Seminar, Social Theory, Statistics, and Research Methods). In addition to the core, students must take one additional course in research methods and at least two elective courses in the department. Students must complete either a thesis (6 hours) or a research practicum (6 hours). The remaining 8 hours are electives.

Students must earn at least a B in each *core* course. Students earning a C in one of these courses must repeat the course and earn at least a B the next time it is offered. Students earning a C in two of these courses will be suspended from the program.

Admission to Candidacy Requirements

Completion of at least 24 hours of required work.

Assistantships

The Department of Sociology offers both teaching assistantships and research assistantships; the latter are dependent upon faculty research funding. Teaching assistants assist faculty with coursework, or teach the undergraduate lab sections in research methods and statistics. They are paid approximately \$9,000.00 for nine months of twenty hours per week work during the academic year. The workload and pay for research assistants varies. Assistantships are awarded on the basis of merit and experience.

Internships

While there is no formal system of ongoing internships, agencies do contact the department to find students who would be interested in an internship. Consequently, internships are optional and dependent upon a match between an agency's needs and a student's skills and interests.

Core Courses (must take all four)

- SOCY 5151 Pro-Seminar: Social Problems and Social Policy (3)
- SOCY 6651 Social Theory (3)
- SOCY 6652 Issues in Social Research (3)
- SOCY 6653 Advanced Quantitative Analysis (3)

Additional Courses in Research Methods (must take at least one)

- SOCY 6090 Topics in Sociology (as appropriate, and with permission of the Director of Graduate Studies) (3)
- SOCY 6136 Qualitative Research Methods (3)
- SOCY 6617 Data Utilization (3)
- SOCY 6630 Investigating Health and Health Services (3)
- SOCY 6640 Evaluation Research for Applied Sociology (3)

Outside Electives

Students may take electives (up to 6 hours) from other departments as long as courses are at the graduate level (5000 or above).

Advising

The Graduate Director advises all graduate students until they select a person to serve as their Committee Chair.

Transfer Credit

With departmental approval, students may transfer in up to six hours of graduate work for which the applicant received a grade of B or better from another institution, related UNC Charlotte degree program or related post-baccalaureate work.

Committee

The student's committee shall consist of three faculty members: the Chair and two other individuals who assist with completion of the thesis or research practicum. One member of the committee, not the chair, may be from outside the department.

Thesis

Students formulate a theoretically motivated or applied research question or argument and collect or analyze existing empirical data to answer that question.

Research Practicum

As an alternative to the traditional thesis, students have the option of a research practicum. This may be combined with an internship. The student works with an organization or agency to complete a research evaluation project for the agency.

Research Opportunities/Experiences

Faculty members are actively engaged in research and students are strongly recommended to work with faculty to develop research expertise. In addition, a number of faculty members have funded research projects or internships on which qualified graduate students are able to work.

Tuition Waivers

Both out-of-state and in-state tuition assistance may be available and are awarded on the basis of merit and experience.

Financial Assistance

Other than the assistantships and waivers described above, the Department offers the Pearson Fellowship, which is awarded annually to a graduate or undergraduate student who has interests and goals in improving race relations, expanding social justice, and establishing a more peaceful world. The award is made every spring and consists of \$500 to be applied to tuition at UNC Charlotte.

COURSES IN SOCIOLOGY

SOCY 5090. Topics in Sociology. (3) Prerequisite: Permission of the instructor. Intensive treatment or survey of related topics, depending on student needs and interests. May be repeated for credit as topics vary. (*On demand*)

SOCY 5111. Social Inequality. (3) Distribution of power, privilege and prestige; correlates and consequences of

inequality; national and international comparisons. (*On demand*)

SOCY 5125. Urban Sociology. (3) Cross cultural analysis of urban development, social structure, ecology, demographic composition, and social problems. (*On demand*)

SOCY 5130. Sociology of Health and Illness. (3) The cultural and structural influences on the definition of health and illness; models of illness behaviors; health demography and epidemiology; social influences on the delivery of health care; ethical issues surrounding health and illness; the development of relevant social policy. (*Yearly*)

SOCY 5131. Family Policy. (3) Critical analysis of four aspects of family policy; the historical and cultural factors that have resulted in specific policies affecting the family; the specification of contemporary family policy at both the national and state level; the intended and actual application of existing family policy; and the implications and impact of policies as they are interpreted and implemented. (*On demand*)

SOCY 5134. Families and Aging. (3) Theories explaining the formation and functioning of American families with emphasis on the impact of the aging of society; examination of the current demographic trends and expectations of multigenerational families as well as the future demands and modifications. (*Yearly*)

SOCY 5135. Sociology of Education. (3) Educational institution; the school class as a social system; the school as a social environment and a complex organization. (*Yearly*)

SOCY 5150. Older Individual and Society. (3) Review of the theories explaining the formation and functioning of American families with emphasis on the impact of the aging of society. Examination of the current demographic trends and expectations of multigenerational families as well as the future demands and modifications. (*Yearly*)

SOCY 5151. Pro-seminar: Social Problems and Social Policy. (3) Prerequisite: graduate student in sociology or senior sociology major. Introduction to the discipline of sociology and the UNC Charlotte department; basic skills for graduate school. Graded on a pass/fail basis. (*Fall*)

SOCY 5154. Contemporary Social Theory. (3) Elements and process of theory construction; contemporary social theories such as theories of social order and causation, power, class structure and inequality; group process theories; post-modern theories. (*On demand*)

SOCY 5156. Quantitative Analysis. (4) Prerequisites: SOCY 4155 or permission of instructor. Concepts and procedures of sociological analysis; data processing; measurement theory; and quantitative models of analysis. Three hours of lecture/discussion and completion of weekly laboratory units. (*Fall, Spring*)

SOCY 5156L. Quantitative Analysis Laboratory. (0)
Corequisite: SOCY 5156. Required weekly laboratory session for Quantitative Analysis.

SOCY 5631. Seminar in Family Violence. (3) Prerequisite: senior, graduate student or permission of the instructor. Family violence in the context of a changing society and family system. Principal foci: child abuse, sexual abuse, spouse abuse; other forms of family violence. Investigation of these topics in terms of sociocultural influences and internal dynamics of families. *(On demand)*

SOCY 5632. Changing American Family. (3) Family theories; family system in relation to other social systems; integration of marital, parental and occupational roles in context of changing socioeconomic influences; traditional versus contemporary family roles; breakdown in stable family functioning. *(On demand)*

SOCY 6090. Topics in Sociology. (3) Prerequisite: permission of department. Intensive treatment of a topic or survey of related topics, depending on student needs and interests. may be repeated for credit as topics vary. *(On demand)*

SOCY 6130. Sociology of Aging: Theories and Research. (3) Application of stratification theories and demography are applied to the older population. Issues of race, gender, socio-economic status, age, and geographic distribution are examined to investigate the diversity of the older age group and their access to resources. *(On demand)*

SOCY 6135. Social Context of Schooling. (3) The political economy of schooling; race, class, and gender effects on educational processes and outcomes; the school as a complex organization; the sociology of school reform movements. *(Alternate years)*

SOCY 6136. Qualitative Research Methods. (3) Collection and analysis of qualitative data including use of grounded theory and a variety of qualitative techniques, consideration of ethical issues and the use of data. *(On demand)*

SOCY 6137. The Political Economy and School Reform. (3) Prerequisite: SOCY 4135, graduate status, or permission of instructor. Relationship between the business community's vision for school reform and the school restructuring movement locally and nationally, including social and political processes associated with corporate involvement in defining the problem with schools and shaping solutions, the intersection of education and the economy, and the relationship between schooling and social inequality. *(On demand)*

SOCY 6138. Social Organization of Health Care. (3) Focuses on the structures and operations of health care institutions and providers. The topics covered include the socio-historical development of the existing health care system, health care occupations and professions, professional power and autonomy, professional socialization, inter-

professional and provider-patient relations, health care organizations and the delivery of services, and how social change affects the health care sector. *(On demand)*

SOCY 6614. Self and Society. (3) Examination of theoretical constructs and substantive concerns relevant to the socialization process; comparison of symbolic interactionism, ethnomethodology, phenomenology; emphasis on social construction of reality in various "social worlds" (deviant, work, family). *(Alternate years)*

SOCY 6615. Dilemmas in Organizations. (3) Examines organizational theory and research focused on organizational behavior, inter-organizational relations, relations with external stakeholders and organizational culture. Case study analysis, group-problem solving and the study of concrete organizational dilemmas. *(On demand)*

SOCY 6616. Stratification and Inequality. (3) Examination of theories of stratification and the causes, processes and social consequences of economic and political inequality; assumptions behind, mechanisms for, and consequences of government and private sector strategies to address problems associated with inequality. *(Alternate years)*

SOCY 6617. Data Utilization. (3) Methodological and statistical strategies for applied sociological research within organizational settings; selecting the best strategies consistent with budgetary, manpower and organizational constraints; interpreting and communicating research results in ways understandable to and useful for organizational decision-makers. *(Alternate years)*

SOCY 6630. Investigating Health and Health Services. (3) Prerequisites: SOCY 4130, or graduate standing, or permission of instructor. Useful to those seeking research careers, to administrators in health care, and to primary care providers. How to conduct and evaluate research in health care settings, emphasizing both quantitative and qualitative methodologies as well as the utilization of secondary data. *(Alternate years)*

SOCY 6635. The Social Context of Mental Health. (3) Cross-listed as SOWK 6635, PSYC 8636, and PPOL 8636. Prerequisite: Admission to graduate program or permission of instructor. This course draws upon contributions from the field of psychiatry, psychology, social work, and anthropology. The focus is on mental health and illness in social context, with an emphasis on the relationship between social structure and mental health/disorder. We will examine the social factors which shape psychiatric diagnosis, the effects of socio-demographic variables on mental health, and the role of social support and stress for different groups. The course also examines the organization, delivery, and evaluation of mental health services, and mental health care policy. *(Every other year)*

SOCY 6640. Evaluation Research for Applied Sociology. (3) Prerequisites: SOCY 6652 and introductory statistics. Evaluation research from an applied sociological perspective,

including incorporation of social theory, substantive social science knowledge, and research techniques into the evaluation of a variety of programs, interventions, and policies. (*On demand*)

SOCY 6651. Social Theory. (3) Analysis of contemporary social theories, with emphasis on their implications for planned change. (*Fall*)

SOCY 6652. Issues in Social Research. (3) Examination of epistemology of social research; assumptions and methods of specific research strategies; ethical and policy issues of applied and academic research. (*Spring*)

SOCY 6653. Advanced Quantitative Analysis. (3) Prerequisites: six hours in Introductory Statistics and/or Research Methods. Contemporary techniques of data analysis, management and processing applied to specific topics; measurement models, data reduction strategies, and multivariate procedures. (*Fall*)

SOCY 6895. Tutorial in Sociology. (1-4) Prerequisite: permission of instructor. Directed reading and/or research; development of expertise in substantive area. May be repeated for credit. (*Fall, Spring, Summer*)

SOCY 6897. Research Practicum. (1-6) Prerequisite: SOCY 6651 and 6652. Preparation of research paper based upon research completed within a community organization or agency. The student will develop a consultant-client relationship with the agency or organization and conduct a research/evaluation project on behalf of the agency or organization (such as a needs assessment, program evaluation, social impact assessment or policy analysis). (*Fall, Spring, Summer*)

SOCY 6996. Thesis. (1-6) Prerequisites: completion of all other coursework and admission to candidacy by Graduate Committee. Applied, academic, or theoretical research project, defended before graduate faculty. May be repeated for credit up to six hours. (*Fall, Spring, Summer*)

SOCY 7999. Master's Degree Graduate Residency Credit. (1) (*Fall, Spring, Summer*)

Spanish

- **M.A. in Spanish**
- **Graduate Certificate in Translating and Translation Studies**

Department of Languages and Culture Studies

427 College of Education
704-687-8753 or 704-687-8754
<http://languages.uncc.edu>

Coordinator

Dr. Michael Scott Doyle

Graduate Faculty

Spanish

Michael Scott Doyle, Professor
Ann B. González, Professor
Martha LaFollette Miller, Professor
Carlos Coria-Sánchez, Associate Professor
Robert M. Gleaves, Associate Professor (Emeritus)
Concepción Godev, Associate Professor
Maryrica Ortiz Lottman, Associate Professor
José Manuel Batista, Assistant Professor
Richard File-Muriel, Assistant Professor
Jasleen Kohli, Assistant Professor
Samuel Monder, Assistant Professor
Anton Pujol, Assistant Professor

Classical Languages

Dale Grote, Associate Professor

French

Marie-Thérèse Noiset, Professor
Michèle Bissière, Associate Professor
Russell Rose, Associate Professor (Emeritus)
Robert Sandarg, Associate Professor
Katherine Stephenson, Associate Professor
Christine Vance, Associate Professor
Allison Stedman, Assistant Professor

German

Robert Reimer, Professor
Anabel Aliaga-Buchenau, Associate Professor
Paul Youngman, Associate Professor

Japanese

Fumie Kato, Assistant Professor

MASTER OF ARTS IN SPANISH

The Master of Arts in Spanish is designed to provide a rich variety of graduate coursework in a major world language that is becoming increasingly important in the United States. The program builds on a comprehensive

undergraduate curriculum and consists of two tracks: Language, Literature and Culture (LLC) and Translating and Translation Studies (TTS). The M.A. in Spanish serves individuals who seek a greater understanding of Spanish language, literatures and cultures, and who seek career and professional advancement opportunities in education, translation, applied language (Business Spanish), and who contemplate pursuing a Ph.D. in fields such as Hispanic literature, linguistics, translating and translation studies, intercultural communication, or international studies.

Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for the M.A. in Spanish:

- 12) A baccalaureate degree in Spanish or in a related field that required upper-division coursework in undergraduate Spanish (e.g., Latin American Studies, International Studies, International Business), with an overall GPA of at least 2.75 (on a 4.0 scale).
- 35) An acceptable score on the Aptitude Portion of the Graduate Record Examination (GRE).
- 36) An essay that addresses the applicant's motivation for enrolling in the M.A. in Spanish, to include particular areas of research interests and career or professional goals. Students seeking enrollment in the LLC track should write this essay in Spanish and demonstrate a high level of proficiency in Spanish by attaching an additional writing sample (a college term paper or similar document). Students seeking enrollment in the TTS track may write the essay in either English or Spanish but must demonstrate high levels of literacy and proficiency in both languages by providing writing samples in each.
- 37) An oral interview with the Graduate Coordinator.
- 38) Three letters of reference. For those interested in the LLC track, at least two of the letters must be from professors. For those interested in the TTS track, at least one of the letters must come from a professor, and letters not written by a faculty member must be from professionals working in the field of Spanish, translating and interpreting, or a closely related area (Latin American Studies, International Studies, International Business, etc.).

Prerequisite Requirements

Applicants who do not have advanced-level undergraduate coursework in Spanish language and the literature and culture of Spain and Latin America will be required to take a minimum of two courses in these areas as part of their preparation for enrollment in the M.A. program. Such coursework may be taken as a post-baccalaureate graduate student (PBG), and up to six hours of such coursework with a grade of B or higher may be transferred forward to the M.A. program upon admission to the program.

Degree Requirements

The Master of Arts in Spanish requires 36 graduate credit hours: either 36 hours of graduate coursework or 30 hours

of graduate coursework plus a master's thesis (6 credit hours). For any course to count toward the M.A. in Spanish, it must have been taken within six years from the date of enrollment in the program. All coursework must have a grade of A or B in order to be counted toward the M.A. in Spanish.

Admission to Candidacy Requirements

Upon successful completion of a minimum of 18 semester hours of graduate coursework, and in no case later than four weeks prior to the beginning of the semester in which he/she expects to complete all requirements for the degree, a student should file for admission to candidacy on a form that is available in the Graduate School. This application is a check sheet approved by the student's advisor, and program administrator listing all coursework to be offered for the degree (including transferred credit and courses in progress).

Assistantships

A limited number of graduate assistantships are available on a competitive basis each year. Applications must be received no later than April 15 for assistantships beginning the following academic year. Further information is available in the Department.

Internships

The Department approves a limited number of internships (SPAN 5410 and TRAN 6480S) which provide program-related experience for graduate students who seek to develop their Spanish skills in a professional setting. Further information is available in the Department.

Practica

The Department offers TRAN 6481S, Translation Cooperative Education (1-3 hours of credit) to provide on-site work in translating texts or interpreting, English↔Spanish. Site, workload and remuneration to be determined in consultation with employer and one faculty co-op advisor. Provides practical and professional training experience under conditions that the University cannot duplicate.

Core Courses

All M.A. candidates, regardless of which track option is pursued—Language, Literature and Culture (LLC) or Translating and Translation Studies (TTS)—must complete four graduate core courses (12 hours) distributed as follows: one in Spanish literature, one in Spanish American literature, one in Spanish or Spanish American civilization and culture, and one in Spanish linguistics.

Track Descriptions

Track I: Language, Literature and Culture (LLC).

In addition to the 12 core hours, the LLC track formally consists of 24 hours of graduate credits—either 24 hours of graduate coursework or 18 hours of graduate coursework plus a master's thesis (6 credit hours)—in Spanish and

Spanish American literature, Spanish and Spanish American civilization and culture (including literature and film studies), Spanish linguistics, methodology, applied language (Spanish for business and international trade), special topics in Spanish, and may include up to 3 hours of professional internship in Spanish. The LLC track allows for an in-depth development of Spanish language skills and is especially recommended for teachers of Spanish. It also provides excellent preparation for individuals who may wish to pursue the Ph.D. in Spanish, for whom courses in literature and linguistics are especially recommended.

Track II: Translating and Translation Studies (TTS).

In addition to the 12 core hours, the TTS track formally consists of 24 hours of graduate credits—either 24 hours of graduate coursework or 18 hours of graduate coursework plus a master's thesis (6 credit hours)—in the history and theory of translation, and the analysis and translation of different types of texts and discourse: business, technical, medical, legal, scholarly, and literary. It may also include special topics courses in Spanish↔English translation, up to 3 hours of professional internship in translating, and a translation thesis (equivalent to 6 hours). Coursework in applied language areas such as Business Spanish is especially appropriate for the TTS track. This specialized track serves individuals interested in a career in professional translation or in enhancing their career or work opportunities as specialists in the language and culture industries. It also provides preparation for those who may wish to pursue a Ph.D. in fields such as Spanish, linguistics, translating and translation studies, intercultural communication, or international studies.

Electives

With the approval of the department, a student may take 3 hours of elective credit in related areas as part of the 30-36 hours. The student must submit a written request to the Graduate Coordinator explaining how these hours of elective credit will enrich his/her program.

Advising

Graduate students will be advised by the Graduate Coordinator and by designated graduate faculty members in good standing.

Transfer Credit

Up to six hours of appropriate graduate credit may be accepted for transfer from another accredited institution. Additional non-residence credit for graduate study abroad may be possible via departmental pre-approval.

Licensure

Students seeking licensure in Spanish should obtain information on requirements from the Teacher Education Advising and Licensure Office (TEAL) in the College of Education.

Comprehensive Examination

After Admission to Candidacy, each student must successfully complete a four-hour comprehensive

examination, based partly on a core Reading List and partly on the coursework completed. The Reading List is published online at www.languages.uncc.edu/masters. The student must be enrolled during the semester in which he/she takes the comprehensive examination, which is usually taken during a student's final semester of enrollment in the program. The exams are scheduled twice a year: usually in mid to late November of each Fall semester and in mid to late April of each Spring semester.

Thesis

The M.A. thesis is optional for both tracks: Language, Literature and Culture (LLC) and Translating and Translation Studies (TTS).

Application for Degree

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

Tuition Waivers

A limited number of in-state as well as out-of-state tuition waivers may be available for new graduate assistants and/or outstanding applicants.

GRADUATE CERTIFICATE IN TRANSLATING & TRANSLATION STUDIES

The Department of Languages and Culture Studies at UNC Charlotte offers a Graduate Certificate in Translating and Translation Studies (GCTTS: English ↔ Spanish) designed for post-baccalaureate, graduate, and post-graduate students. Students typically complete the required 18 graduate credit hours in 2-3 semesters, and may begin the program in either the fall or spring semester, or during the summer. Students enrolled in the Language, Literature and Culture track (LLC) of the M.A. in Spanish program can earn the Graduate Certificate in TTS by completing the 12 hours of Certificate Requirements indicated below. Students interested in adding on the Graduate Certificate in TTS to the M.A. in LLC or TTS must apply separately for the Certificate. One application does not cover both programs. Students in the Certificate Program will study the history, theory, and profession of translation; work intensively in the analysis and translation of different types of discourse, including non-literary and literary texts; become familiar with computer-assisted translation; and develop advanced post-editing skills. Graduate level coursework may also include special topics courses in translation and up to 3 hours of professional internship credit in translating. Translating is done from both Spanish to English and English to Spanish.

Admission Requirements

Students must apply for admission to the Graduate School

and must have a minimum undergraduate GPA of 2.75. Applicants will generally have a baccalaureate degree in Spanish or in a closely related area that requires sufficient upper-division coursework in Spanish (e.g., Latin American Studies, International Studies, International Business), or an undergraduate degree, certificate or minor in translation (English to Spanish, Spanish to English). They will be required to submit:

- 13) A current GRE or MAT score (international students have an additional requirement of submitting official scores on the Test of English as a Foreign Language [TOFEL]).
- 39) A well-developed essay in English that addresses the applicant's motivation for enrolling in the Graduate Certificate.
- 40) Three letters of reference (from professors, specialists in translation, and/or employers).
- 41) An oral interview with the Graduate Coordinator.
- 42) A portfolio of best writing samples in both English and Spanish or of translations into each language (with original text to accompany each translation submitted).

Certificate Requirements (12 hours)

- TRAN 6001S History and Theory of Translation
- TRAN 6472S Advanced Non-Literary Translating I (Business, Legal, Governmental)
- TRAN 6474S Advanced Non-Literary Translating II (Medical and Technical)
- TRAN 6476S Advanced Literary and Cultural Translating

Electives (6 hours)

- SPAN 6001 Advanced Studies in Spanish Language (especially recommended)
- TRAN 6003S Translating and the Computer
- TRAN 6480S Translation Internship
- TRAN 6900S Special Topics in English↔Spanish Translation Studies (may substitute for a course listed under Certificate Requirements above)
- TRAN 6901S Advanced Project in English↔Spanish Translating (may substitute for a course listed under Certificate Requirements above)

Other Courses

As appropriate and approved by the Department. Graduate courses in Hispanic literature, civilization and culture, and linguistics are especially recommended because of the insight they provide into the Spanish language and Hispanic cultures (see courses offered in the LLC track of the Spanish M.A.).

Generally, only graduate courses taken at UNC Charlotte will count toward the Graduate Certificate. However, up to a maximum of 6 hours of coursework may be transferred into the Certificate program if the courses are approved by the Department of Languages and Culture Studies. Twelve

of the 18 credit hours for the Graduate Certificate must be taken in residency.

COURSES IN SPANISH

SPAN 5050. Selected Topics in Spanish. (1 2 3)

Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Consideration of a predetermined topic. May be repeated for credit as topics vary. (*On demand*)

SPAN 5120. Advanced Business Spanish I. (3) Cross-listed

as LTAM 5120. Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Advanced studies in Business Spanish, intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as economics, management, and marketing. (*Fall*)

SPAN 5121. Advanced Business Spanish II. (3) Cross-

listed as LTAM 5121. Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Advanced studies in Business Spanish, intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as marketing, finance, and import-export. (*Spring*)

SPAN 5122: Studies in Advanced Business Spanish. (3)

Cross-listed as LTAM 4322. Prerequisites: SPAN 3201, 3202, 3203, and 3220, or permission of the Department. Advanced studies in special topics in Business Spanish (e.g., Tourism in Spain and Latin America, Free Trade in the Americas [NAFTA/TLCAN, Mercosur, The Andean Pact, CAFTA-DR], Socioeconomic Issues in the Greater Caribbean, Business and Technology in Latin America and Spain). May be repeated for credit as topics vary. (*On demand*)

SPAN 5201. Nineteenth Century Spanish Literature. (3)

Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Survey of Peninsular literature from Costumbrismo through the Generation of 1898. Lectures, discussions, and reports. (*On demand*)

SPAN 5202. Twentieth Century Spanish Literature. (3)

Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Treatment of major literary developments from the Generation of 1898 to present day. Lectures, discussions, and reports. (*On demand*)

SPAN 5205. Novel of the Golden Age. (3) Prerequisites:

Post-baccalaureate status, B.A. in Spanish, or permission of the Department. El Lazarillo through El Criticón. Lectures, discussions, and reports. (*On demand*)

SPAN 5206. Theater of the Golden Age. (3) Prerequisites:

Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Study of works of the leading dramatists of the period. Lectures, discussions, and reports. (*On demand*)

SPAN 5210. Studies in Spanish American Poetry. (3) Cross-listed as LTAM 5310. Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Studies of 19th and 20th century Spanish American poetry. *(On demand)*

SPAN 5211. Studies in Spanish American Prose Fiction. (3) Cross-listed as LTAM 5311. Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Studies of 19th and 20th century Spanish American prose fiction. *(On demand)*

SPAN 5212. Studies in Spanish American Theater. (3) Cross-listed as LTAM 5312. Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Studies of 20th century Spanish American theater. *(On demand)*

SPAN 5213. Don Quijote. (3) Prerequisites: Post-baccalaureate status, B.A. in Spanish, or permission of the Department. Study of Cervantes' masterpiece. *(On demand)*

SPAN 5410. Professional Internship in Spanish. (1-6) Prerequisites: Post-baccalaureate status, B.A. in Spanish, and permission of the department. Faculty-supervised field and/or research experience in a cooperating profession (e.g. business) or community organization. Contents of internship based upon a contractual agreement among the student, department, and business or community organization. Offered on a Pass/unsatisfactory basis. *(Fall, Spring, Summer)*

SPAN 5800. Directed Individual Study. (1-3) Prerequisite: Post-baccalaureate status, B.A. in Spanish or permission of the Department. Individual work on a selected area of study. To be arranged with the instructor, generally during the preceding semester. By special permission only. May be repeated for credit. *(On demand)*

SPAN 6001. Advanced Studies in Spanish Language. (3) Selected topics in Spanish linguistics. Topics may include a) history of the Spanish language; b) introduction to Spanish phonology and morphology; and c) Spanish dialectology. May be repeated for credit as topics vary. *(On demand)*

SPAN 6003. Studies in Hispanic Culture and Civilization. (3) Selected topics on the civilization and culture of the Spanish-speaking world. Possible emphases include 1) the press in Spanish America; 2) song texts of the Hispanic world; 3) Spanish cinema; 4) Spain since Franco; 5) Hispanics in the United States. May be repeated for credit as topics vary. *(On demand)*

SPAN 6005. Advanced Studies in Spanish Literature. (3) Study of selected works and writers from Spain. May be repeated for credit as topics vary. *(On demand)*

SPAN 6007. Advanced Studies in Spanish American Literature. (3) Cross-listed as LTAM 6307. Study of

selected works, writers, literary genres, periods, and schools from Spanish America. May be repeated for credit as topics vary. *(On demand)*

SPAN 6201. Hispanic Language and Culture through Media. (3) In-depth study of contemporary Hispanic culture and language through media sources, including print, radio, film, Internet, and television. The course provides cultural exposure, and practice in written and oral communication, and training in the use of technology--assisted instruction. May be repeated for credit as topics vary. *(On demand)*

SPAN 6901. Advanced Project. (1-3) Appropriate research and written exposition of that research. The proposed project, as well as the final product, will be approved by a committee of three faculty members appropriate to the topic, appointed by the Chair of the department after consultation with the student and the Graduate Coordinator, on the basis of a written proposal from the student. May be repeated for credit as topics vary. *(On demand)*

SPAN 6902. Thesis. (1-6) Appropriate research and written exposition of that research. The proposed project, as well as the final product, will be approved by a committee of three faculty members appropriate to the topic, appointed by the Chair of the Department after consultation with the student, on the basis of a written proposal from the student. (A statement of recommendations and requirements for form and procedure is available in the office of the Department of Languages and Culture Studies.) *(On demand)*

SPAN 7999. Master's Degree Graduate Residency Credit. (1) *(Fall, Spring, Summer)*

COURSES IN TRANSLATING & TRANSLATION STUDIES

TRAN 6001S. History and Theory of Translation. (3) Theories of translation from Horace and Cicero to the present. Provides a historical, theoretical, and sociological framework for the translation enterprise. Emphases may differ from year to year. May be repeated for credit as topics vary. *(On demand)*

TRAN 6003S. Computer-Assisted Translating. (3) Focus on discourse and textual typologies (representative kinds of writing and kinds of documents and texts) that the practicing translator may encounter. Development of reading, recognition, and reproduction skills. Strategies for lexical development and terminology management. May be repeated for credit as topics vary. *(On demand)*

TRAN 6472S. Workshop on Non-Literary Topics I (Business, Legal, Governmental). (3) Theory-based workshop practicum dealing with the English↔Spanish translation of authentic business, legal, and/or governmental documents. Emphasis may center on any one of these types of discourse or any combination thereof. May be repeated for credit as topics vary. *(On demand)*

TRAN 6474S. Workshop on Non-Literary Topics II (Medical and Technical). (3) Theory-based workshop practicum dealing with the English↔Spanish translation of authentic medical, technical, and/or scientific documents. Emphasis may center on any one of these types of discourse or any combination thereof. May be repeated for credit as topics vary. *(On demand)*

TRAN 6476S. Workshop on Literary and Cultural Topics. (3) Theory-based workshop practicum dealing with the English↔Spanish translation of literary and/or cultural texts. Emphasis may center on one or both of these types of discourse. May be repeated for credit as topics vary. *(On demand)*

TRAN 6480S. Translation Internship. (1-6) On-site work in translating texts or interpreting, English↔Spanish. Site and workload to be determined in consultation with employer and one faculty internship advisor. Provides practical and professional training experience under conditions that the University cannot duplicate. *(On demand)*

TRAN 6481S. Translation Cooperative Education. (1-3) On-site work in translating texts or interpreting, English↔Spanish. Site, workload and remuneration to be determined in consultation with employer and one faculty co-op advisor. Provides practical and professional training experience under conditions that the University cannot duplicate. *(On demand)*

TRAN 6900S. Special Topics in English↔Spanish Translation Studies. (3) Selected topics in English↔Spanish Translating and Translation Studies, e.g., continued study of theories of translation, translation of a literary genre such as prose fiction, drama or poetry, translation of historical, political or social documents, or interpretation. May be repeated for credit as topics vary. *(On demand)*

TRAN 6901S. Advanced Project in English↔Spanish Translating. (1-3) Selected topics in English↔Spanish Translating and Translation Studies, e.g., continued study of theories of translation, translation of a literary genre such as prose fiction, drama or poetry, translation of historical, political or social documents, or interpretation. May be repeated for credit as topics vary. *(On demand)*

TRAN 6902S. Thesis. (1-6) Appropriate research and written exposition of that research, or substantial English↔Spanish translation project with critical

introduction and commentary. The proposed thesis work, as well as the final product, will be approved by a committee of three faculty appropriate to the topic, appointed by the Chair of the Department after consultation with the student and the Graduate Coordinator, on the basis of a written proposal from the student. (A statement of recommendations and requirements for form and procedure is available in the office of the Department of Languages and Culture Studies.) *(On demand)*

TRAN 7999. Master's Degree Graduate Residency Credit. (1) *(Fall, Spring, Summer)*

Women's & Gender Studies

- Graduate Certificate in Gender, Sexuality, and Women's Studies

Women's & Gender Studies Program

245J Fretwell

704.687.6205

<http://womensstudies.uncc.edu>

Program Director

Dr. Coral Wayland

cwayland@uncc.edu

Graduate Director

Dr. Jennifer L. Hartman

jhartman@uncc.edu

GRADUATE CERTIFICATE IN GENDER, SEXUALITY, AND WOMEN'S STUDIES

The Graduate Certificate in Gender, Sexuality and Women's Studies can be earned in conjunction with master's or doctoral work in a wide variety of subjects. The certificate can also be earned through a freestanding course of study not linked to a graduate degree. The Graduate Certificate in Gender, Sexuality and Women's Studies will expose students from a variety of disciplines to the core theories and approaches used in studies of women, gender (which includes masculinity), feminism, and sexuality.

The certificate program is open to all students who hold a bachelor's degree from an accredited university and either:

- 1.) are enrolled and in good standing in a graduate degree program at UNC Charlotte, or
- 2.) have a minimum undergraduate GPA of 2.75

All students are admitted to the Graduate School in a special category for certificate programs. In addition to the general requirements for graduate certificate programs explained under the "Academic Regulations & Degree Requirements" section of the *Catalog*, students should submit a letter explaining the applicant's educational and work background, interests, and plans, with an emphasis on how this certificate will enhance, complement, or advance the applicant's work and/or education.

Certificate Requirements

The Graduate Certificate in Gender, Sexuality and Women's Studies requires the completion of a minimum of 12 credit hours of graduate course work. This includes 2 core courses and 2 elective courses.

Core Courses

Students are required to complete 2 of the following courses. Students should select the courses that most closely reflect their interests.

- WGST 6601 Theoretical Approaches to Sexuality
- WGST 6602 Theoretical Approaches to Gender
- WGST 6603 Language, Gender and Power
- WGST 6627 Feminist Theory and its Applications

Electives

Students are also required to complete 2 elective courses at the graduate level. Any graduate level course offered by the Women's and Gender Studies Program will count as an elective. Elective courses can also come from other disciplines. These courses may be seminars, directed readings or directed research courses as long as they focus on women, gender, feminism, or sexuality. Students wishing to use a course offered in another department or program as an elective should have the Director of Women's and Gender Studies approve the course prior to enrolling in it.

Transfer Credit

Transfer credit is not accepted in the certificate program.

COURSES IN WOMEN'S AND GENDER STUDIES

WGST 5050. Topics in Women's Studies. (1-3)

Prerequisites and credit hours vary with topics. Special topics in Women's Studies. May be repeated for credit as topics vary. (*On demand*)

WGST 6050. Topics in Women's Studies. (1-3)

Prerequisites and credit hours vary with topics. Special topics in Women's Studies. May be repeated for credit as topics vary. (*On demand*)

WGST 6601. Theoretical Approaches to Sexuality. (3) An interdisciplinary examination of the history of sexuality and contemporary theories of sexuality and the body. Topics covered include historical aspects of sexuality; representations of sexuality; politics of sexuality; critiques of psycho-analytic approaches to sexuality; feminist engagement with biological constructions of sexuality; and queer theory. (*Alternate years*)

WGST 6602. Theoretical Approaches to Gender. (3) An interdisciplinary examination of the core theories about the role of gender in identity formation and social organization. Topics covered include the feminist critique of biological essentialism; gender as a continuum; the social construction of gender; gender performativity; historical changes in gender; masculinity studies; the intersection of race, class and gender; and the economics of gender. (*Alternate years*)

WGST 6603. Language, Gender and Power. (3) An examination of the ways language constructs sexual difference and power relations among groups. Topics include the role of language in structuring individual identity and human relations; how that process informs the nature of social institutions; and the control language exercises over human society, from the private to the public domain. (*Alternate years*)

WGST 6627. Feminist Theory and its Applications. (3) An examination of selected works in feminist thought across the disciplines. (*Alternate years*)

WGST 6800. Directed Reading/Research. (3)

Prerequisites: prior written permission of instructor and Women's and Gender Studies Director. Independent investigation of a problem or a topic in Gender, Sexuality or Women's Studies, culminating in a research paper or a final report. Student must provide a written plan of work before registering for the course. May be repeated for credit. (*On demand*)

General Graduate Courses in Liberal Arts & Sciences

ANTHROPOLOGY

ANTH 5090. Topics in Anthropology. (3) Prerequisite: permission of the instructor. Intensive treatment of a topic in anthropology or survey of related topics. Examples: Religion, Art, and Archaeology; Islam and Globalism. May be repeated for credit as topics vary. (*On demand*)

ANTH 5120. Intercultural Communications. (3)

Prerequisite: ANTH 1101 or permission of instructor.

Learning to cope with cultural differences; contrasting value systems; cross-cultural and communication styles; nonverbal communication; cultural relativity; culture and business; ethnocentrism; cultural shock. (*Alternate years*)

ANTH 6132. Culture, Health and Aging. (3) Exploration of the interaction between culture and the aging experience, with a particular emphasis on issues of health and the health care system. (*On demand*)

FRENCH, GERMAN, AND LANGUAGES & CULTURE STUDIES

French

FREN 5003. Studies in French Literature. (3) Prerequisite: Post-baccalaureate status, B.A. in French, or permission of the Department. Course may be repeated with change of topic. (*On demand*)

FREN 5005. Studies in the French Language. (3) Prerequisites: Post-baccalaureate status, B.A. in French, or permission of the Department. Course may be repeated with change of topic. (*On demand*)

FREN 5007. Studies in French Culture and Civilization. (3) Prerequisites: Post-baccalaureate status, B.A. in French, or permission of the Department. Course may be repeated with change of topic. (*On demand*)

FREN 5050. Topics in French. (1-3) Prerequisites: Post-baccalaureate status, B.A. in French, English 1102 or equivalent if taught in English. May be taught in French or English. Will not count toward the major if taught in English. Course may be repeated with change of topic. (*On demand*)

FREN 5120. Advanced Business French I. (3) Prerequisites: Post-baccalaureate status, B.A. in French, or permission of the Department. Advanced studies in Business French, with intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as economics, management, and marketing. (*On demand*)

FREN 5121. Advanced Business French II. (3) Prerequisites: Post-baccalaureate status, B.A. in French, or permission of the Department. Advanced studies in Business French, with intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as marketing, finance, and import-export. (*On demand*)

FREN 5201. Survey of French Literature I. (3) Prerequisite: Post-baccalaureate status, B.A. in French, or permission of the Department. The major literary movements from the Middle Ages to the Enlightenment, with sample texts. Emphasis on continuity and change. (*On demand*)

FREN 5202. Survey of French Literature II. (3) Prerequisite: Post-baccalaureate status, B.A. in French, or permission of the Department. The major literary movements from the Enlightenment to the contemporary period, with sample texts. Emphasis on continuity and change. (*On demand*)

FREN 5410. Professional Internship in French. (1-6) Prerequisites: Post-baccalaureate status, B.A. in French, or permission of the Department. Faculty-supervised field and/or research experience in a cooperating profession (e.g., business) or community organization. Contents of internship based upon a contractual agreement among the student, department, and business or community organization. Offered on a Pass/Unsatisfactory basis. (*Fall, Spring, Summer*)

FREN 5800. Directed Individual Study. (1-3) Prerequisite: Post-baccalaureate status, B.A. in French, or permission of the Department. Individual work on a selected area of study. To be arranged with the instructor, generally during the preceding semester, and by special permission only. May be repeated for credit. (*On demand*)

German

GERM 5010. Periods in the History of German Literature. (3) (a) Medieval literature, (b) Classicism, (c) Romanticism, (d) Nineteenth Century, (e) Contemporary literature. Prerequisites: Post-baccalaureate status, B.A. in German, or permission of the Department. Study of the major writers and works in a given period. Readings, lectures, and reports. May be repeated for major credit with change of topic. (*On demand*)

GERM 5020. The Chief Genres in German Literature. (3) (a) Novel, (b) Theater, (c) Lyric poetry, (d) short prose fiction. Prerequisites: Post-baccalaureate status, B.A. in German, or permission of the Department. An analysis of a major genre and its development within German literary history. Readings, lectures and reports. May be repeated for major credit with change of topic. (*On demand*)

GERM 5050. Special Topics in German. (1-3) Prerequisite: Post-baccalaureate status, B.A. in German, or permission of the Department. Treatment of a special group or figure in German literature, specialized topic in German culture or language, or special problems in German conversation. May be repeated for credit with change of topic. (*On demand*)

GERM 5120. Advanced Business German I. (3) Prerequisites: Post-baccalaureate status, B.A. in German, or permission of the Department. Advanced studies in Business German, intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as economics, management, and marketing. (*On demand*)

GERM 5121. Advanced Business German II. (3)

Prerequisite: Post-baccalaureate status, B.A. in German, or permission of the Department. Advanced studies in Business German, intensive practice in speaking, listening comprehension, reading, writing, and translation in functional business areas such as marketing, finance, and import-export. *(On demand)*

GERM 5203. Survey of German Literature I. (3)

Prerequisites: Post-baccalaureate status, B.A. in German, or permission of the Department. General introduction to German literature from the Middle Ages to the Classical Period. Book reports and class discussion on collateral readings. *(On demand)*

GERM 5204. Survey of German Literature II. (3)

Prerequisite: Post-baccalaureate status, B.A. in German, or permission of the Department. German literature since Classicism. Book reports and discussions on collateral readings. *(On demand)*

GERM 5410. Professional Internship in German. (1-6)

Prerequisites: Post-baccalaureate status, B.A. in German, or permission of the Department. Faculty-supervised field and/or research experience in a cooperating profession (e.g., business) or community organization. Contents of internship based upon a contractual agreement among the student, department, and business or community organization. *(Fall, Spring, Summer)*

GERM 5800. Directed Individual Study. (1-3)

Prerequisite: Post-baccalaureate status, B.A. in German, or permission of the Department. Individual work on a selected area study. To be arranged with the instructor, generally during the preceding semester, and by special permission only. May be repeated for credit. *(On demand)*

Language and Culture Studies

LACS 5050. Topics in Foreign Language. (3) Prerequisite: Post-baccalaureate status, B.A. in French, German or Spanish, or permission of the Department. Studies in a selected field of interest. May be repeated for credit with change of topic. *(On demand)*

LACS 5200. Secondary Methods--Foreign Languages. (3)

Prerequisite: Post-baccalaureate status, B.A. in French, German or Spanish, or permission of the Department. Current trends and practices in teaching foreign and second languages in the middle school and high school, with emphasis on practical applications. Addresses state mandated competencies. Required for licensure in the teaching of foreign language and recommended for licensure in teaching English as a Second Language. *(On demand)*

LACS 5201. Foreign Languages in the Elementary School Methods. (3)

Prerequisite: Post-baccalaureate status, B.A. in French, German or Spanish, or permission of the Department. Current trends and practices in teaching foreign and second languages in the elementary school, with emphasis on practical applications. Addresses state mandated competencies. Required for licensure in the teaching of a foreign language and recommended for licensure in teaching English as a Second Language. *(On demand)*

LACS 5800. Directed Individual Study. (1-3)

Prerequisite: Post-baccalaureate status, B.A. in French, German or Spanish, or permission of the Department. Individual work on a selected area of study. To be arranged with the instructor, generally during the preceding semester, and by special permission only. May be repeated for credit. *(On demand)*



Inter-College Graduate Programs

Health Psychology

- **Ph.D. in Health Psychology**

Ph.D. Program in Interdisciplinary Health Psychology

704-687-4763

<http://psych.uncc.edu/health-home.html>

Program Director

Dr. Virginia Gil-Rivas, Director of Interdisciplinary Health Psychology Program

Dr. George Demakis, Director of Clinical Training

Graduate Faculty

Communication Studies

Christine Davis, Ph.D.

Gerontology

Dena Shenk, Ph.D.

Psychology

Art Blume, Ph.D.

James Cook, Ph.D.

Lawrence Calhoun, Ph.D.

Arnie Cann, Ph.D.

George Demakis, Ph.D.

Mark Faust, Ph.D.

Paul Foos, Ph.D.

Jane Gaultney, Ph.D.

Virginia Gil-Rivas, Ph.D.

Paula Goolkasian, Ph.D.

Mason Haber, Ph.D.
Susan Johnson, Ph.D.
Ryan Kilmer, Ph.D.
Richard McAnulty, Ph.D.
Amy Peterman, Ph.D.
Richard Tedeschi, Ph.D.
Jennifer Webb, Ph.D.

Public Health Sciences

Andrew Harver, Ph.D.

Karen Schmaling, Ph.D.

Sociology

Teresa Scheid, Ph.D.

Special Education and Child Development

Richard White, Ph.D.

PH.D. IN HEALTH PSYCHOLOGY

Health psychology is dedicated to conducting basic and applied research examining the contribution of biological, psychological, behavioral, social, cultural, and environmental factors to health and illness.

Health Psychology builds from principles and theories of other areas of psychology, biology, health, and social sciences. Health psychologists are concerned with promotion and maintenance of health, the prevention and treatment of illness across the lifespan, and improvement of systems that promote and maintain health.

A particular emphasis of the Health Psychology program is on the development, implementation, and evaluation of

prevention and treatment interventions that involve multiple disciplines. The program has links with other colleges, departments, and programs in the university including the College of Health and Human Services, College of Education, and the Gerontology Program which allows students to select health courses across disciplines.

The Health Psychology doctoral program at UNC Charlotte offers students an opportunity to obtain their Ph.D. in Health Psychology in one of three tracks: Clinical Health, Community Health, and General Health.

Admission Requirements

Applicants are expected to have a minimum of 18 hours of coursework in psychology including Introductory Psychology and Research Methods, coursework in undergraduate statistics, excellent scores on the GRE Exam, and an excellent academic track record as demonstrated by undergraduate or graduate grade point averages.

Documents to be Submitted for Application for Admission

Applicants are expected to complete an application online to the Graduate School. The application also must include two official transcripts of all completed academic work, an official score on the GRE exam, three letters of reference from persons, preferably psychologists, who can speak to the applicant's promise as a doctoral student, a two page statement of professional goals and research interests, a current resume or CV, and a professional writing sample. International students must submit official TOEFL test scores of at least 557 on the written test or a 220 on the computer-based test, or at least 85% on the Michigan English Language Assessment. All tests must be taken within the last two years.

Admission Assessment

Admissions reviews are conducted by track faculty. The deadline for all application materials is December 1. Review of applications typically occurs in January, interviews in February, and admissions offers typically made in March.

Student Responsibility

Students who succeed in the Health Psychology program are hardworking, competent, disciplined scholars with interests in the science of Health Psychology. Students must demonstrate intellectual curiosity and a passion for the science of psychology. It is important for student applicants to determine if their professional interests are well matched to the expertise of our faculty members.

Degree Requirements

Total Hours required

For the Clinical Health emphasis, which will enable students to become eligible for licensure as a Health Services Provider, 88 hours (post baccalaureate) will be required. For the Community and General emphases, 78 hours (post baccalaureate) will be required. All coursework taken at

UNC Charlotte that will count toward the Ph.D. will be 6000-level or above. The majority of the coursework will be at the 8000 level.

Transfer Credit

The maximum amount of transfer credit that a Ph.D. student may count towards a doctorate is 30 semester hours. The student's advising committee will recommend transfer credits that are consistent with the student's program of study to the Graduate School for approval.

Grades Required

Graduate students must have a 3.0 GPA in the courses on their degree plan of study in order to graduate. More than two grades of C or one U will result in termination from the program.

Plan of Study

Students will develop a plan of study with their advising committees.

Admission to Candidacy

After successfully passing the qualifying examination, students must successfully propose and defend a dissertation topic. A student advances to candidacy after the dissertation topic has been approved by the student's doctoral committee. Candidacy must be achieved at least 6 months before the degree is conferred.

Financial Support

Assistantships are generally available to provide financial support for eligible students. Assistantships vary and may involve teaching, research, or clinical activities. The Graduate School provides tuition support for full time students on assistantships on a competitive basis.

Graduate Course Requirements

Courses Required

Doctoral courses are numbered at the 8000 level.

The curriculum has 4 major curricular components:

- 1) Core Health Psychology
- 2) Research
- 3) Interdisciplinary Content
- 4) Specialization (Clinical, Community, or General Experimental)

Specific requirements within each component vary by track. Specifics can be found in the graduate handbook of the program.

Student Advising

Students are assigned an advisor before the first semester. Students in consultation with the advisor create an advising committee constituted by three health psychology faculty. The student meets with the committee regularly for issues of professional development and guidance in the program. Students may change advisors with permission of the director.

Other Requirements

- Master's thesis or second year research project
- Written comprehensive examination prior to beginning dissertation research
- Dissertation
- Year-long, pre-doctoral internship (Clinical Health students only)

Time limits for completion

Students are admitted for either full-time study or intensive part-time study. Students entering the doctoral program post-baccalaureate must complete their degree, including the dissertation, within 8 years. Full-time students must meet benchmark requirements each year to maintain their status as a doctoral student. Part-time students also must meet benchmark requirements that occur approximately every two years. These benchmarks are intended to help students achieve their goal of completing the doctorate in a timely manner.

The graduate school has specific requirements that students should be familiar with. Please see the relevant sections of this *Catalog* for specific details.

Comprehensive (Qualifying) Examination

Qualifying examinations are meant to demonstrate broad competence as a scholar in the disciplines of Health Psychology, interdisciplinary health, and the track-specific discipline (clinical, community, or general experimental psychology). The Comprehensive Project results in a practical product that demonstrates integration of knowledge from these three areas. In addition, it provides an opportunity to strengthen and develop a student's skills, as specified by his/her advisory committee. Projects are identified via a collaborative process, involving the student and his/her committee. The Comprehensive Project acts as the gateway into the 4th year and dissertation. Students must pass their Comprehensive Project successfully to continue in the program.

Each student's advisory committee, in consultation with the Director of the Interdisciplinary Health Psychology Program, tailors the content and format of the Comprehensive Project with attention to the student's professional goals. The Comprehensive Project process will include three main components: written project, brief integrative paper, and oral presentation.

Students must complete their second year research projects prior to taking the qualifying examination, must have at least a 3.0 GPA, must not be on probation, and must have removed any conditions placed upon them at the time of admission. Comprehensive Projects should be in process no later than the third academic year in the program. Comprehensive Projects must be completed successfully before students may rise to doctoral candidacy and propose their dissertation project

Doctoral Committee

The doctoral committee is formed after successful completion of the qualifying exam. The student must complete the graduate student petition to create the committee. The committee must include at least three members of the health psychology faculty as well as the Graduate School-appointed Graduate Faculty representative.

Dissertation

The dissertation must be successfully proposed and defended before being undertaken. The major advisor directly supervises the student on the dissertation project with support from the dissertation committee. See Graduate School policies regarding dissertations.

Application for Degree

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

Research Opportunities

Students in health psychology are expected to engage in collaborative and independent research activities. Many opportunities are available through the program, including experience in qualitative and quantitative research methods. Many Health Psychology faculty members engage in grant funded research and opportunities exist for research assistantships.

COURSES IN HEALTH PSYCHOLOGY

PSYC 8000. Interdisciplinary Approaches to Health. (3)

Prerequisite: PSYC 8200 and doctoral student standing. This course will provide an overview of conceptualizations of health as approached from different disciplines, including psychology, medicine, nursing, and public health. It will examine ways that the construct of health is used in research and treatment by various disciplines. Facilitation of understanding of interdisciplinary models of research addressing health issues is a primary goal of the course. In addition, it will foster the development of appreciation for contributions that various disciplines make to treatment of illness and promotion of health. It will also emphasize the development of effective communication with multiple disciplines in research and treatment settings. (*Spring*)

PSYC 8050. Topics in Psychological Treatment. (3)

Cross-listed as PSYC 6050. A topical course which will focus on issues in treatment, alternative treatment perspectives, special client populations. May be repeated for credit with departmental permission. (*Yearly*)

PSYC 8099. Topics in Psychology. (3) Cross-listed as PSYC 6099. A discussion of selected topics in psychology. May be repeated for credit as topics vary. (*On demand*)

PSYC 8102. Research Design and Quantitative Methods I. (3) Cross-listed as PSYC 6203 and OSCI 8102. Prerequisites: Admission to a Ph.D. program in Psychology or permission of the department. An overview of basic experimental and covariation research designs and the application of descriptive and inferential statistics to the designs. The focus will be on univariate designs, including simple and complex group comparisons, and basic correlational and linear regression strategies. (*Fall*)

PSYC 8103. Research Design and Quantitative Methods II. (3) Cross-listed as PSYC 6204 and OSCI 8103. Prerequisite: PSYC 8102 or equivalent. An introduction to advanced experimental and covariation research strategies. The focus will be on a thorough exploration of applied multiple regression analysis. A brief introduction to selected multivariate models such as discriminant analysis, multivariate analysis of variance, log-linear models, factor analysis, and structural equation modeling will also be provided. (*Spring*)

PSYC 8107. Ethical and Professional Issues in Psychology. (2) See PSYC 6107 for course description.

PSYC 8112. Applied Behavior Analysis. (3) See PSYC 6112 for course description.

PSYC 8141. Intellectual Assessment. (4) See PSYC 6141 for course description.

PSYC 8142. Personality Assessment. (4) See PSYC 6142 for course description.

PSYC 8145. Applied Research Design and Program Evaluation. (3) See PSYC 6145 for course description.

PSYC 8150. Introduction to Psychological Treatment. (4) See PSYC 6150 for course description.

PSYC 8151. Behavior Disorders. (4) See PSYC 6151 for course description.

PSYC 8155. Community Psychology. (3) See PSYC 6155 for course description.

PSYC 8200. Health Psychology 1. (3) Prerequisites: Admission to a Ph.D. program in Psychology or permission of the department. Intensive review of the contributions of the discipline of psychology to the promotion and maintenance of health, the prevention and treatment of illness, and the examination of health behaviors. The course will present an historical overview of psychosomatic medicine and behavioral medicine. The focus will be on biological, cognitive, affective, social and developmental approaches to health and illness experiences. Topics will include stress, coping, adherence to treatment, pain, chronic disease, psychoneuroimmunology and health behavior changes among others. The course will emphasize the

biopsychosocial model in understanding health and disease. (*Fall*)

PSYC 8201. Health Psychology 2. (3) Prerequisite: PSYC 8200. This course is a continuation of Health Psychology 1. (*Spring*)

PSYC 8203. Research Seminar. (1) Prerequisite: Admission to the Interdisciplinary Ph.D. in Psychology Program. A seminar course introducing students to health psychology research in the university. Topics include a discussion of specific ongoing health psychology research, IRB procedures, presenting data at professional conferences, and submission of journal articles and research grants. The course must be taken once in the fall and once in the spring of the student's first full year in the Health Psychology doctoral program. Repeated once for credit. (*Fall, Spring*)

PSYC 8222. Teaching of Psychology. (3) Prerequisite: Admission to doctoral program and permission of department. Strategies for, and issues related to, teaching undergraduate courses in Psychology as part of a general undergraduate education. (*Yearly or on demand*)

PSYC 8243. Diversity in Health Psychology. (3) Prerequisite: Doctoral student standing. This course covers the central ideas and theories related to the role of culture, gender, and socioeconomic status in influencing behavior, cognitions, and emotions as they relate to physical and mental health outcomes. The materials to be reviewed will examine the importance of considering the role of these factors in research, prevention intervention efforts, treatment, and the delivery of health services. (*Yearly*)

PSYC 8255. Community Interventions. (3) Prerequisite: PSYC 8155 and doctoral student standing. Intensive review of the use of system- and organizational-level interventions to promote and maintain health, prevent illness, and improve quality of life. The course will present an historical overview of the effectiveness of different types of interventions, and theoretical and empirical background regarding the conditions and factors that contribute to successful community interventions. Students will develop and implement a community intervention, in collaboration with a local organization, and will develop a grant proposal that would fund a community intervention. (*Fall*)

PSYC 8260. Topics in Health Psychology. (3) See PSYC 6260 for course description.

PSYC 8262. Practicum in Health Psychology. (1-3) See PSYC 6262 for course description.

PSYC 8355. Community Research Practicum. (3) Prerequisite: PSYC 8155 and doctoral student standing. Methods for conducting applied community research. Students will develop and implement applied research project. (*Spring*)

PSYC 8450. Practicum in Clinical Psychology. (1-3) See PSYC 6450 for course description.

PSYC 8455. Practicum in Community Psychology. (1-3) See PSYC 6455 for course description.

PSYC 8636. The Social Context of Mental Health. (3)
Cross-listed as SOCY 6635, SOWK 6635, and PPOL 8636.
Prerequisite: Admission to graduate program or permission of instructor. This course draws upon contributions from the field of psychiatry, psychology, social work, and anthropology. The focus is on mental health and illness in its social context, with an emphasis on the relationship between social structure and mental health/disorder. We will examine the social factors which shape psychiatric diagnosis, the effects of socio-demographic variables on mental health, and the role of social support and stress for different groups. The course also examines the organization, delivery, and evaluation of mental health services, and mental health care policy. (*Every other year*)

PSYC 8899. Readings and Research in Psychology. (1-4) See PSYC 6899 for course description.

PSYC 8950. Internship. (3) **Prerequisite:** Admission to the Interdisciplinary Ph.D. in Psychology Program satisfactory completion of comprehensive examination, approval of research topic by dissertation committee, and permission of the department. Placement in a pre-doctoral clinical internship at an American Psychological Association approved site or at another site approved by the Director of Clinical Training. Internship typically lasts for one continuous year. Course to be repeated a total of 6 credits over a one year period. (*Fall, Spring, Summer*)

PSYC 8999. Doctoral Dissertation Research. (1-9)
Prerequisites: Admission to the Interdisciplinary Ph.D. in Psychology Program, satisfactory completion of comprehensive examination, and approval of research topic by dissertation committee. Execution of original research that culminates in the preparation and presentation of a doctoral dissertation in a topic of health psychology. May be repeated for credit. Offered on a *Pass/unsatisfactory* or *IP* basis only. (*Fall, Spring, Summer*) (*Day, Evening, Weekend*)

Infrastructure and Environmental Systems

- **Ph.D. in Infrastructure and Environmental Systems**

Ph.D Program in Infrastructure & Environmental Systems

704-687-2293 or 704-687-1347
www.ce.uncc.edu/INES

Program Directors

Dr. David T. Young, Director
Dr. John A. Diemer, Associate Director

Graduate Faculty

Architecture

Dale Brentrup, Professor
David J. Thaddeus, Associate Professor

Biology

Lawrence S. Barden, Professor
James Oliver, Professor
Inna Sokolova, Associate Professor
Todd R. Steck, Associate Professor

Chemistry

Brian T. Cooper, Associate Professor
Bernadette T. Donovan-Merkert, Professor
Thomas D. DuBois, Charles H. Stone Distinguished Professor of Chemistry
Kenneth Gonsalves, Celanese Acetate Distinguished Professor of Polymer Chemistry
Craig A. Ogle, Professor
Jordan Poler, Associate Professor

Civil and Environmental Engineering

James E. Amburgey, Assistant Professor
Brian J. Anderson, Associate Professor
James Bowen, Associate Professor
David Boyajian, Assistant Professor
Shen-en Chen, Assistant Professor
John Daniels, Associate Professor
Janos Gergely, Associate Professor
Johnny R. Graham, Professor
Helene Hilger, Associate Professor
Hilary I. Inyang, Duke Energy Distinguished Professor
Rajaram Janardhanam, Professor
Martin R. Kane, Associate Professor
Srinivas S. Pulugurtha, Assistant Professor
Kimberly A. Warren, Assistant Professor
David C. Weggel, Associate Professor
Jy Wu, Professor
David Young, Professor and Department Chair

Economics

Gaines H. Liner, Professor
Stanislov Radchenko, Associate Professor
Peter Schwarz, Professor

Geography and Earth Sciences

Craig Allan, Associate Professor
John Bender, Professor
Andy Bobyarchick, Associate Professor
Harrison S. Campbell, Associate Professor
John Chadwick, Assistant Professor
Eric Delmelle, Assistant Professor
John Diemer, Professor
Matt Eastin, Assistant Professor
Martha C. Eppes, Assistant Professor
Edd Hauser, Professor
Scott P. Hippensteel, Associate Professor
Gerald Ingalls, Professor
Anne Jefferson, Assistant Professor
Walter Martin, Associate Professor
Ross Meentemeyer, Associate Professor
Jean-Claude Thill, Knight Distinguished Professor
Wei-Ning Xiang, Professor

Engineering Management

S. Gary Teng, Professor
Ertunga Ozelkan, Assistant Professor
Yesim Sireli, Assistant Professor

PH.D. IN INFRASTRUCTURE AND ENVIRONMENTAL SYSTEMS (INES)

The Ph.D. in Infrastructure and Environmental Systems (INES) is an interdisciplinary program focusing on the complex challenges facing urbanized regions, specifically those issues related to the interplay between the environment and infrastructure needed to support the regions' economic and social development. Understanding and solving these challenges require an innovative approach that considers three aspects (engineering, science, and management) of optimal solutions and that promotes an understanding of the interdependency of the three in earth, civil, and industrial systems.

Graduates of the INES Ph.D. program will have an understanding of complex, interdisciplinary infrastructure and environmental systems and will make significant contributions to the advancement of knowledge of those systems in academia, local, state or federal government, and not-for-profit and for-profit institutions. The educational objectives designed to achieve these goals are:

- 1) To provide students with educational opportunities in science, engineering, and management, culminating in an interdisciplinary research-based Ph.D. in Infrastructure and Environmental Systems.
- 2) To prepare students for careers as doctoral-level research scientists, engineers, and resource and systems

managers who will lead in developing the next generation of infrastructure and environmental technology.

- 3) To involve students in the support and expansion of the base of research in rapidly growing fields related to infrastructure and environmental systems in the Charlotte region, North Carolina, and across the nation and world.
- 4) To enhance the educational experience in science and engineering for all students, graduate and undergraduate, at UNC Charlotte.
- 5) To expand the educational experience of students by participating in the activities of interdisciplinary institutes at UNC Charlotte such as the Global Institute for Environmental and Energy Systems (GIEES), the Center for Applied Geographic Information Service (CAGIS), the Center for Transportation Policy Studies, and the UNC Charlotte Urban Institute.

Admission Requirements

The following are general guidelines for successful admissions into the Ph.D. in Infrastructure and Environmental Systems:

- 1) The equivalent to a U.S. baccalaureate or master's degree, from a regionally accredited college or university, in Engineering, Earth Science/Geology, Chemistry, Biology or a related field with a minimum undergraduate GPA of 3.2 or a minimum graduate GPA of 3.5 (A = 4.0) in all graduate work.
- 2) Acceptable scores on the verbal, quantitative and analytical sections of the Graduate Record Examination (GRE). The INES Admissions Committee generally expects aggregate GRE scores to be in the upper 50th percentile.
- 3) A minimum score of 220 (computer-based test) or 557 (paper-based test) on the Test of English as a Foreign Language (TOEFL) for applicants whose native language is not English.
- 4) Three letters of reference, two of which must be from faculty members.
- 5) An essay which addresses the applicant's motivation and area of research interest.
- 6) Students entering the program will be expected to remedy any course work deficiencies identified by their advisory committee in the first semester after enrolling in the program. The amount and kinds of remedial coursework required for the program will depend on the background of the student and will be established by the INES Admissions Committee and the student's advisory committee. It is important to note that this program will emphasize the quantitative and analytical skills necessary to confront the challenges of urban and regional growth and development.

Documents to be Submitted for Application for Admission

The Office of the Graduate School at UNC Charlotte requires the following documents be submitted in the application package for each student:

- 1) Two official transcripts from all colleges and universities attended
- 2) Official GRE scores (verbal, quantitative and analytical)
- 3) Official TOEFL scores if the student's native language is not English.
- 4) The UNC Charlotte application for graduate admission form
- 5) Three letters of reference
- 6) The essay which addresses the applicant's motivation, prospective INES Ph.D. program focus area (civil engineering design, science, or management), and research issues of interest.

Admission Assessment

- 1) An Admissions Committee will review applications and recommend to the Program Director whether each applicant should be admitted or not and, if so, under what conditions.
- 2) The Program's Admissions Committee will assess each student's previous academic coursework in light of the student's stated direction of study. This assessment will be used to identify the strengths and weaknesses of the student's previous academic history and to suggest specific course work, if required, for the student's program of study. The amount and kinds of any remedial course work required for the program will depend on the student's background and will be established by the Admissions Committee and confirmed by the Program Director. The Admissions Committee may also suggest specific coursework based on the student's intended direction of study within the program. The Admissions Committee will conduct this assessment upon the student's acceptance and formal declaration of intent to attend. For each entering student, a member of the INES Ph.D. Faculty will be selected to serve as his or her major advisor for the first year in the Program.

Student Responsibility

Students entering the program must present evidence that they are capable of undertaking the coursework required of them. Such evidence must include familiarity, background, and/or interest in infrastructure and environmental issues, in one of the focus areas of design (engineering), science, or management.

Students may have completed equivalent courses elsewhere. Normally, transcripts will provide the evidence required by the Admissions Committee. However, if the student's previous experience is offered as evidence, the student must provide all the documentation necessary to specify such experience. A more detailed list of the types of pre-requisite coursework can be found on the Program's website.

Degree Requirements

The degree of Doctor of Philosophy in Infrastructure and Environmental Systems is awarded for completion of scholarly research that advances the knowledge base in the field of that research. Evidence of this is demonstrated by a successful dissertation defense. In addition, recipients of the degree should demonstrate a mastery of relevant subject matter and a potential for success in research and teaching.

As summarized below, the INES Ph.D. program requires a minimum of 72 post baccalaureate (semester) credit hours (a minor in this program is not applicable). A master's degree in an appropriate field, that is consistent with the admission requirements, may count up to 30 hours of transfer credit into the INES Program upon recommendation of the Program Director and upon approval by the Graduate School.

Minimum Credit Hrs. to Degree Required for Master's Entrants

INES Core. Total: 15 credit hrs.

Core courses - 9 credit hrs.

Case study - 3 credit hrs.

Seminars - 3 credit hrs.

Specialized (Focus Area) Electives - 9 credit hrs.*

Directed Studies (additional courses/research) - 0 credit hrs*

Dissertation Research - 18 credit hrs.

Total Credits Beyond Master's Degree - 42 credit hrs.*

**based on a maximum of 30 credit hours transferred from a master's program. Less than 30 credit hours transferred into the INES Program will result in a higher number of credit hours to be completed at UNC Charlotte.*

Minimum Credit Hrs. to Degree Required for Bachelor's Entrants

INES Core. Total: 15 credit hrs.

Core courses - 9 credit hrs.

Case study - 3 credit hrs.

Seminars - 3 credit hrs.

Specialized (Focus Area) Electives - 15 credit hrs.

Directed Studies (additional courses/research) - 24 credit hrs.

Dissertation Research - 18 credit hrs.

Total Credits Beyond Bachelor's Degree - 72 credit hrs.

Plan of Study

Students who enter the Ph.D. Program must prepare a plan of study before the end of their second semester in the Program. The plan of study will propose a schedule for completion of all coursework by the student. Each plan will be approved the student's doctoral committee and by the Program Director.

Admission to Candidacy

After passing the qualifying examination, a student can propose a dissertation topic. A student advances to candidacy after the dissertation topic has been approved by the student's doctoral committee. Candidacy must be achieved at least 6 months before the degree is conferred.

Financial Support

The INES program offers financial support in the form of assistantships and tuition grants as described below.

Assistantships

Research and teaching assistantships are available from the INES Program on a competitive basis to qualified applicants/students.

Tuition Grants

Tuition grants including partial and full out-of-state and in-state tuition support are available on a competitive basis for out-of-state and in-state students, respectively.

Graduate Course Requirements

All courses taken for credit in the INES Ph.D. program shall be graduate level courses (6000-level and 8000-level: graduate students only), and the majority shall be at the Ph.D. level (8000-level: Ph.D. students only). Core courses, the case study course, and seminar courses (all designated INES 8000-level courses) will be open only to Ph.D. students. All 6000-level courses available as specialized electives will be open only to graduate students (Master's and Ph.D.). No credit will be given in the INES Program for graduate coursework completed at the combined undergraduate-graduate level (5000-level at UNC Charlotte).

For students entering the INES Ph.D. Program who have completed a master's degree, the minimum number of hours specified below in each category will be adjusted based on the number of transfer credits awarded to the student for his/her master's work.

INES Core (courses + case studies + seminars = 15 credit hours minimum)

INES Ph.D. students will participate in interdisciplinary activities throughout their program of study. Students will begin with a set of interdisciplinary core courses that teach them about key aspects of infrastructure and environmental systems present in all applications of INES. These common aspects are reflected in five (5) core offerings (3 core courses; 1 case study; and 1 continuous seminar). First, students will complete 2 required core courses and 1 additional core course selected from a menu of other course offerings. Then, at midpoint, students will participate in an interdisciplinary case-study course, and, finally, throughout the program, students will participate in interdisciplinary seminar courses.

Focus Area (specialized) elective courses (15 credit hours minimum)

It is recognized that doctoral degree study requires advanced knowledge of issues, the breadth of which depends on the context and objectives of the academic program. Both the infrastructure and the environment involve broad and multi-faceted issues. Beyond the core, a student needs to support doctoral research with enrollment in particular

courses related to his/her research. For this reason, a minimum of 15 credit hours have been reserved for specialized (focus area) electives. The objective of these specialized electives is to provide an opportunity for students, their advisors, and their doctoral committee to select a complementary set of specialized courses intended to focus the student's area of interest and research.

Focus area courses will come from many fields and sub-fields of various academic departments of UNC Charlotte. Many acceptable courses in each focus area are currently offered in various departments at the master's level and Ph.D. levels. Selected courses must be approved by each student's advisor and doctoral committee.

Focus Area 1: Infrastructure and Environmental Systems

Design (INESD): The engineering, analysis, and design of infrastructure and environmental systems requires expertise in subject matter areas related to engineering principles, applications, and design methodologies. These areas include plan formulation, dimensioning of systems that could be structural and/or control systems, selection of material properties, and configuration of monitoring methodologies and approaches. Also, some basic knowledge of the causes and effects of the physical sciences as well as functional requirements of the facilities concerned needs to be provided to the student. .

Focus Area 2: Infrastructure and Environmental Systems

Science (INESS): Successful development and management of infrastructure require baseline scientific information on the nature of the ambient environment. This focus area is designed for the INES student who is interested in environmental systems and their response to the operation of infrastructure. This focus area encourages the student to deepen his or her knowledge in the physical, chemical and biological processes that operate in the environment in which we live.

Focus Area 3: Infrastructure and Environmental Systems

Management (INESM): To be able to efficiently and effectively plan and manage infrastructure system or environmental system operations, the INES student interested in this focus area needs to obtain, integrate, and utilize knowledge in operations efficiency, effective policy development and deployment, legal issues and government regulations, intelligent support systems for decision making, effective environmental and/or socio-economic impact control measures, efficient systems project management, comprehensive evaluation of system performance, and smart systems implementation and management that includes the consideration of facility, people, policy, technology, economics, and procedures. The students who choose to focus in this area of INES will obtain the expertise in effective systems management and implementation in infrastructure system and/or environmental system areas and will work as senior managers and/or researchers in the above areas.

Directed Studies (24 credit hours minimum)

In recognition of varying backgrounds, preparation, interests, and goals, each student may complete additional credits through directed studies (courses, research, or individual study), with the consent of his/her advisor and doctoral committee. This category may include courses within a student's focus area as well as courses outside the focus area. Within the directed studies category, a student may complete a maximum of 9 credits of independent study toward the Ph.D. degree.

Dissertation Requirement (18 credit hours minimum)

The INES doctoral program includes a minimum of 18 hours of dissertation credit. The number of research credits taken each semester must be approved by the student's advisor and doctoral committee. Each student must complete and defend a dissertation based on a research program approved by the student's doctoral committee. The dissertation must be of high quality and represent an original piece of research that advances the body of knowledge in infrastructure and environmental systems. Oral presentation and successful defense of the dissertation before the student's doctoral committee in a forum open to the public will be required. A copy of the student's dissertation will be made available to the graduate faculty of the program at least two weeks prior to the public defense. The dissertation must be written in a format acceptable to the Graduate School.

Student Advising

Upon acceptance into the INES Ph.D. Program, a student will be assigned an interim advisor by the Program Director. Within the first year in the Program, each student will select a permanent doctoral research advisor. This selection will be approved by the Program Director and Dean of the Graduate School. At any time a student may request a change in initial supervisor or research advisor. These requests will be submitted to the Program Director for consideration and action.

Other Requirements

Requirements for grades, transfer credits, residency, and time limits for completion match those described generally for the university. Various forms must be submitted to the Graduate School at various times by each INES student. Those forms include: Application for Transfer of Credit into a Graduate Degree Program; INES Plan of Study; Appointment of Doctoral Committee; Application for Qualifying Examination; Qualifying Examination Report; Graduate School Petition for Topic Approval; Application for Candidacy; Application for Degree; and Dissertation Defense Report for Doctoral Candidates. Refer to the appropriate sections of this *Catalog* and to the Graduate School website for details.

Comprehensive (Qualifying) Examination

Each student must complete a three-part qualifying examination: two written parts and one oral part. The first written examination covers two INES core courses (INES 8101 and INES 8102). The second written examination covers focus area courses selected by the student's advisor

and doctoral committee. The third examination is an oral examination and is administered by the student's doctoral committee and requires a presentation and defense by the student of his or her proposed research topic. Students who enter the Ph.D. Program directly from a baccalaureate program generally will sit for the two written examinations before the end of their third post-baccalaureate year in the program; students who enter from a master's degree program must sit for both written parts before the end of their second year in the program. To sit for these examinations, a student must have at least a 3.0 GPA and must have removed all conditions upon admission.

A student may attempt to pass each part of the qualifying exam no more than twice. Failure of any of the three parts a second time will result in termination of enrollment in the Ph.D. Program.

Doctoral Committee

Each student's Doctoral Committee will contain five members. One committee position will be filled by a UNC Charlotte Graduate Faculty member appointed by the Dean of the Graduate School. The remaining four members will be recommended, before the completion of the student's first year in the program, by the student's Doctoral Research Advisor, with input from the Program Director. Recommended faculty members should have expertise in the student's area of research interest. The Program Director will approve, with subsequent concurrence by the Dean of the Graduate School, the four recommended faculty members to serve on the Committee. The doctoral program committee of each student will be chaired by the student's Doctoral Research Advisor.

At least three of the Doctoral Committee members must be INES Program Faculty members. No more than three doctoral committee members can come from the same academic department, in order to reflect the interdisciplinary nature of the program. The inclusion of one member from outside the University of North Carolina Charlotte is strongly encouraged, and this person must also be a member of the UNC Charlotte Graduate Faculty.

Dissertation

The INES doctoral program includes a minimum of 18 hours of dissertation credit. Each student must complete and defend a dissertation based on a research program approved by the student's doctoral committee. The dissertation must be of high quality and represent an original piece of research that advances the body of knowledge in infrastructure and environmental systems. Oral presentation and successful defense of the dissertation before the student's doctoral committee in a forum open to the public will be required. A copy of the student's dissertation will be made available to the graduate faculty of the program at least two weeks prior to the public defense. The dissertation must be written in a format acceptable to the Graduate School and shall satisfy all requirements and deadlines specified by the Graduate School.

Application for Degree

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

Research Opportunities

INES faculty members reside in two primary departments (Civil & Environmental Engineering and Geography & Earth Sciences) and five supporting departments (Biology, Chemistry, Economics, Systems Engineering & Engineering Management, and the School of Architecture). INES Faculty members in these departments currently conduct research in their specialized areas of interest as well as in inter-disciplinary areas. Every INES Faculty member is qualified to serve as the doctoral advisor for Ph.D. students. Ph.D.-level research is currently being conducted in the areas of water resources engineering, water and waste water analysis and treatment, bioremediation, drinking water and pathogenic studies, water quality modeling, waste containment, contaminant transport, deep foundations, soil-structure interaction, in-situ soil assessment, geosynthetics, composite materials, masonry structures, bridge monitoring, extreme (blast) loading, progressive collapse, material corrosion and durability, structural insulated panels, non-destructive testing, human factors in transportation engineering, highway safety, traffic operations, transportation planning, and intelligent transportation systems, hydrology, hydrogeology, Quaternary science, tectonic geomorphology, tropical meteorology, atmospheric modeling, GIS, remote sensing, coastal processes, structural geology, tectonics, geochemistry, petrology, sedimentology, and stratigraphy.

COURSES IN INFRASTRUCTURE AND ENVIRONMENTAL SYSTEMS

Notes:

- *Permission of the instructor is required on all classes in the INES Ph.D. program*
- *Some of these courses may be offered during one of the summer sessions as well as during one of the semesters. Check with summer course schedules for details.*

INES 8090. Topics in Infrastructure and Environmental Systems. (3) Selected topics in civil and environmental engineering, earth sciences, engineering management, biology, chemistry, economics, or public policy. Course may be repeated for graduate credit. (*On demand*)

INES 8101. Environmental Systems. (3) Prerequisite: Admission into the INES PhD program. This course examines the principles of energy and mass transport as applied to the atmosphere, hydrosphere, lithosphere and the Earth's biogeochemical systems and how these impact human activities and infrastructure. Emerging environmental issues and technologies in the areas of

environmental impact due to human activities and natural disasters, and environmental sustainability including industrial ecology, waste minimization and recycling, will also be examined. (*Fall or Spring*)

INES 8102. Infrastructure Systems. (3) Prerequisite: Admission into the INES PhD program. Overview of urban infrastructural development. Sustainable design features for facilities including municipal, transit, industrial, agricultural, telecommunications, and waste management. Impact of infrastructure development on environmental management including storm water quality and quantity, soil and channel erosion, urban air quality, sprawl, and waste production, treatment, and storage. (*Fall or Spring*)

INES 8110. Acquisition and Analysis of Scientific Data. (3) Prerequisite: Admission into the INES PhD program. The study of theories and techniques for acquiring and analyzing scientific data and information related to the analysis, design and management of the infrastructure and the environment. Includes pertinent aspects of data analysis such as statistical analysis, uncertainty, detection limits, correlation methods, trend analysis, and data management/warehousing. Includes applications of GIS and non-destructive assessment technologies to data acquisition. (*Fall or Spring*)

INES 8113. Case Study. (3) Prerequisite: INES 8101 and INES 8102. Students will work together on interdisciplinary teams to study relevant environmental and infrastructure problems presented through case studies. The intent of the course is to directly involve the students in ongoing urban community projects. (*Fall or Spring*)

INES 8690. Seminar. (1) Prerequisite: Admission into the INES PhD program. Each student will be required to actively participate in program seminars delivered by student researchers, faculty and invited speakers. These seminars will be advertised to the campus and professional communities. Participation in these seminars will count for a total of 3 credits (1 credit for each semester). Prior to graduation, each student will make at least one seminar presentation and provide at least one formal critique of a presentation in this course. Can be repeated for credit. (*Fall and/or Spring*)

INES 8890. Doctoral Independent Study and Project. (1-9) Individual investigation and exposition of results. May be repeated for graduate credit.

INES 8999. Doctoral Dissertation Research. (1-9) Each student will initiate and conduct an individual investigation culminating in the preparation and presentation of a doctoral dissertation.

INES 9999. Doctoral Degree Graduate Residency Credit. (1) Meets Graduate School requirement for continuous enrollment during final term prior to graduation when all course work has been completed. . Pass/no credit grading. Credit for this course does not count toward the degree.

Mathematical Finance

- M.S. in Mathematical Finance

Program Office

349 Friday
704-687-7689
www.mathfinance.uncc.edu

Program Director

Dr. Steven P. Clark
Department of Finance

Graduate Faculty

Finance

Lloyd Blenman, Professor
Richard Buttimer, Professor
I-Hsuan Ethan Chiang, Assistant Professor
Steven P. Clark, Associate Professor
Keener Hughen, Assistant Professor
Tao-Hsien Dolly King, Associate Professor
Steven Ott, Professor
D. Anthony Plath, Associate Professor
Judson Russell, Assistant Professor
C. William Sealey, Professor
Weidong Tian, Associate Professor

Mathematics and Statistics

Robert Anderson, Associate Professor
Joel Avrin, Professor
Jaya Bishwal, Assistant Professor
Wei Cai, Professor
Zongwu Cai, Professor
Pavel Grigoriev, Assistant Professor
Michael Klibanov, Professor
Joseph Quinn, Professor
Isaac Sonin, Professor
Volker Wihstutz, Professor
Mingxin Xu, Assistant Professor
Zhi Yi Zhang, Associate Professor
You-Lan Zhu, Professor

Economics

Ted Amato, Professor
Craig Depken, Associate Professor
John Gandar, Professor
Hwan-Chyang Lin, Associate Professor
Rob Roy McGregor, Associate Professor
Stanislav Radchenko, Assistant Professor
Benjamin Russo, Associate Professor
Dmitry Shapiro, Assistant Professor
Jennifer Troyer, Associate Professor
Arthur Zillante, Assistant Professor
Rick Zuber, Professor

MASTER OF SCIENCE IN MATHEMATICAL FINANCE

The Master of Science in Mathematical Finance program is designed to prepare students to pursue careers in quantitative finance. Increasingly firms of all types, but especially financial institutions, investment banks, and commodities firms, rely upon highly sophisticated mathematical models to identify, measure, and manage risk. The advent of these models has triggered the emergence of a new discipline, Mathematical Finance. This new discipline, sometimes also referred to as “financial engineering,” “computational finance,” or “quantitative finance,” requires professionals with extensive skills in both finance and mathematics.

The Mathematical Finance program at UNC Charlotte is a joint program of the Departments of Finance and Economics in the Belk College of Business and the Department of Mathematics in the College of Liberal Arts and Sciences. Students take courses from all three departments in an integrated curriculum. Students may use electives to tailor the program to their specific interests.

Additional Admission Requirements

In addition to the general requirements for admission to the Graduate School, the following are required for admission to the Master of Science in Mathematical Finance program.

- 1) A baccalaureate degree in a related field with a GPA of at least 2.75 out of 4.0 with an average of 3.0 in the junior and senior years.
- 2) Acceptable scores on each portion of the GRE or GMAT.
- 3) For applicants from non-English speaking countries, a language requirement score of 557 on the TOEFL or 220 on the new computer-based TOEFL or 78% on the MELAB. Non-native speakers of English, may, at the discretion of either the Graduate School or the Program Committee for the MS in Mathematical Finance, be required to enroll in English as a Second Language (ESL) courses at the English Language Training Institute.
- 4) Specific course work equivalent to the following: introductory course in the Theory of Finance; a standard three semester sequence in Calculus; Linear algebra; working knowledge of a suitable programming language; at least one upper-level course in Probability and Statistics. Students lacking this coursework may be admitted subject to the condition that they satisfactorily complete such coursework during the first two semesters that they are enrolled in the program and prior to their taking any program courses where prerequisites are missing.

Prerequisite Requirements

Students may enter this program from a variety of undergraduate backgrounds, including finance, mathematics, economics, computer science, actuarial

science, statistics, information systems and engineering. As a result, many students admitted will not have the required background to immediately begin taking advanced courses from each of three areas of study. In such cases, the student may be required to take prerequisite courses prior to enrolling in advanced courses in specific fields. These prerequisites would be in addition to the advanced 30 semester hours required for the degree. In general students must have the following background in each field before taking advanced courses in that field:

- 1) Finance: Have earned an acceptable grade in an introductory course in finance from an AACSB-accredited business school at either the undergraduate or MBA level.
- 2) Economics: Have earned an acceptable grade in microeconomics and macroeconomics courses at either the undergraduate or MBA level.
- 3) Mathematics: Have earned acceptable grades in the equivalent of a three course sequence in calculus (differential and integral calculus), a course in linear algebra, and an upper-level course in probability and statistics.
- 4) Programming: Students should be familiar with at least one programming language, most preferably C or C++.

Again, students may be admitted to the program without meeting all of these requirements. The Program Director, in conjunction with the Departmental Graduate Coordinators, will evaluate each incoming student's academic background to determine in which prerequisite courses the student will be required to enroll. A student that meets the prerequisites in a field may begin taking advanced courses in that field while still taking prerequisite courses in another field. A student must, however, be making satisfactory progress toward fulfilling their prerequisites in all fields to remain enrolled in the program.

Degree Requirements

Total hours required:

A minimum of thirty hours of course work beyond the bachelor's degree is required to earn the degree. The student must complete the required 24 hours from the program core and 6 hours of approved electives.

The Program Core:

ECON/FINN 6203 Financial Economic Theory
 MATH 6201 Statistical Techniques in Finance or
 ECON 6218 Advanced Business & Economic
 Forecasting
 FINN/ECON 6219 Financial Econometrics
 FINN 6210 Derivatives I: Financial Elements of
 Derivatives
 FINN 6211 Risk Management & Fixed Income
 Derivatives
 MATH 6202 Derivatives II: Partial Differential
 Equations for Finance
 MATH 6203 Stochastic Calculus for Finance

MATH 6204 Numerical Methods for Financial
 Derivatives

Approved Mathematical Finance Electives:

ECON 6090 Topics in Economics
 ECON 6100 Mathematical Economics
 ECON 6112 Graduate Econometrics
 ECON 6201 Advanced Macroeconomic Theory
 ECON 6202 Advanced Microeconomic Theory
 ECON 6235 Monetary Theory and Financial Theory
 ECON 6800 Directed Study Economics
 FINN 6058 Special Topics in Financial Services
 MATH 5128 Applied Probability I.
 MATH 5129 Applied Probability II
 MATH 5143 Analysis I
 MATH 5171 Numerical Solution of Ordinary
 Differential Equations
 MATH 6205 Financial Computing

Admission to Candidacy Requirements

An Admission to Candidacy form listing graduate-level courses that apply to the degree must be submitted to the Mathematical Finance Program Director four weeks prior to the semester in which the student plans to complete the course work for the degree.

Assistantships

A number of assistantships are available each year. In order to be competitive, applications should be submitted by March 15. Additional information is available from the Program Director.

Advising

Advising is done by the Program Director, in conjunction with the Area Coordinators of each of the participating Departments.

Transfer Credit

No more than 6 credit hours and only courses with a grade of A or B at an accredited institution. Requires the recommendation of the Program Director and approval of the Graduate School.

Comprehensive Examination

Student will be required to pass a comprehensive examination. An examining committee will be appointed by the program director and will be constituted from the program's faculty. The exam may be, at the committee's discretion, either written or oral.

Application for Degree

Each student should make application for his/her degree by completing the online Application for Degree through Banner Self Service no later than the filing date specified in the University Academic Calendar.

MATHEMATICAL FINANCE COURSES

Economics Courses

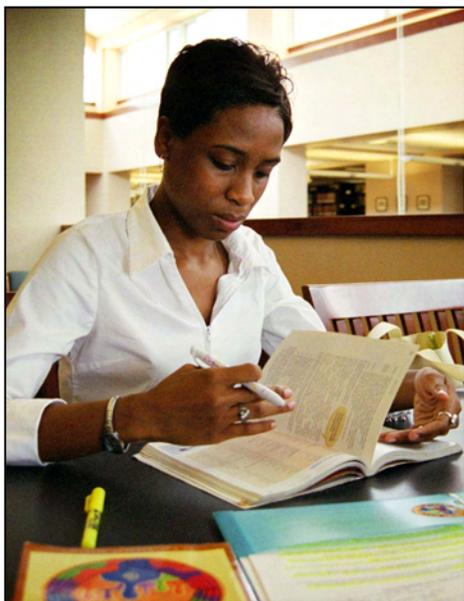
See descriptions of ECON courses under Economics in the Belk College of Business section of this *Catalog*.

Finance Courses

See descriptions of FINN courses under General Graduate Courses at the end of the Belk College of Business section of this *Catalog*.

Mathematics Courses

See descriptions of MATH courses under Mathematics in the College of Liberal Arts and Sciences section of this *Catalog*.



Student Resources and Services

The University of North Carolina at Charlotte provides a comfortable and enjoyable environment for students that is conducive to studying. The services, facilities, and programs of the University promote individual student development and foster a community which promotes the involvement of students in their intellectual, cultural, spiritual, emotional, and physical development.

Students at UNC Charlotte are encouraged to participate in extracurricular activities. Athletics, the Graduate and Professional Student Government (GPSG), the Campus Activities Board, and Student Media are a few of the available activities that can play a significant role in each student's development and total education. Participation in activities, ranging in type from service and religious to athletic and social, and from creative arts and crafts to wilderness experiences, increases a student's opportunities to acquire leadership skills, to experience the responsibilities involved in functioning within a self-governmental process, and to develop personal talents and interests.

***Note:** Students are entitled to participate in several student groups and organizations as long as they are academically eligible to continue their enrollment. However, participation in athletics and student organizations requires students to be in good standing with the University, both academically and in accordance with The Code of Student Responsibility (located elsewhere in this Catalog).*

Where To Go

Student ID/49er Card

Every student's 49er Card (Student ID) displays each student's photo, name, and student ID (different from their Social Security number for privacy reasons). The 49er ID Card (Student ID) proves that you are a member of the campus community and entitled to certain services. It is required to check out materials from the Atkins Library. It is required to obtain services at the Student Health Center. It is required to utilize the facilities in the Belk Gymnasium and the Student Activities Center.

The 49er ID Card is also an important tool that allows you to access to on-campus residences, some classrooms, labs and buildings; obtain meals, and make purchases wherever the 49er Account is accepted. The 49er Account is accepted in vending machines, the Copy Center, The Candy Shoppe at Cone University Center, the Game Room at the Student Activity Center, washer/dryers in Resident laundry rooms, and the Bookstore. It is the required payment for personal copies and printing on campus. Lastly, entertainment venues around Charlotte, such as movie theaters, may offer UNC Charlotte students discounts on admission upon presentation of the 49er Card. For more information, please visit www.auxiliary.uncc.edu/49ercard.

Students can obtain a card in the **ID Office** located on the second floor of Cone University Center across from Main Street Market. They're open Monday through Friday, from 8 a.m. until 5 p.m. Students will be required to present a photo ID and a university document stating your ID number.

Student Union

The student union is the community center of the University, serving students, faculty, staff, alumni, and visitors. It provides services and conveniences that members of the college community need in their daily lives and creates an environment for getting to know and understand others through formal and informal associations.

UNC Charlotte's new Student Union is expected to open Fall 2009. Designed to be the epicenter of campus activity, the yet-to-be-named 196,000 square foot, three-story union is home to student services of every kind including a food court consisting of Wendy's, Starbucks, Mamma Leone's, Zia Juice, and Einstein Bagels; a game room lounge; a 210-seat movie theater; a multi-purpose venue with 600+ seating banquet style; four retail stores; a student organization and activity space; eight meeting rooms; a piano lounge; an art gallery; and study spaces with Wi-Fi.

The **Campus Bookstore**, a Barnes & Noble Booksellers store, will also move to the new Student Union. It offers new and used textbooks, non-required special interest and gift books, school supplies, computer software, greeting cards, gifts, and insignia clothing and other logo items.

Parking for the Student Union is available in the adjacent Union Deck, with a raised walkway to the building. A long timber bridge also connects to residential areas of campus.

Find out more online at <http://studentunion.uncc.edu/>.

Academic Services

www.academicsservices.uncc.edu

The **Academic Services** organization at UNC Charlotte enriches the academic community by offering a broad range of initiatives promoting student success, ensuring access, and enhancing the educational experience of all students. Through transition programs, learning communities, career services, experiential learning, university-wide honors, disability services, tutorial programs, and initiatives for underrepresented students, Academic Services cultivates life skills critical to successful graduation and global citizenship. Addressing the needs of a diverse student population, Academic Services utilizes an integrated student-centered approach which reinforces rigorous academic expectations and encourages student engagement from the time of enrollment through graduation.

Athletic Academic Center

<http://aac.uncc.edu/>

The Charlotte 49ers Athletic Academic Center provides assistance to all Charlotte varsity student-athletes to achieve

academic and personal success at the University by providing support services designed to meet their unique needs and insuring the student athlete's compliance with all National Collegiate Athletic Association, Atlantic 10 Conference and University regulations. Academic advisors provide academic advising services, priority registration, tutorial services, supervised study sessions, a computer lab, résumé writing assistance, a life skills program, and academic recognition.

Disability Services

www.ds.uncc.edu

The Office of Disability Services works with departments across UNC Charlotte to ensure that educational programs and campus facilities are accessible to individuals with disabilities. Disability Services counselors meet with qualified students to determine and provide reasonable and appropriate accommodations that support the student's educational goals.

Assistive technology is available to students with disabilities in the Office of Disability Services, centralized computer labs, Atkins Library, and in other departments on campus. Service animals assisting individuals with disabilities are permitted to all facilities on campus. Prescriptive devices, devices of a personal nature, or personal attendant care are the responsibility of the student. Specific accommodation questions should be directed to a Disability Services counselor.

The Office of Disability Services supports a culturally rich, inclusive, and accessible campus environment by providing disability related education and consultation to faculty, staff, and the community.

Honors College

www.honorscollege.uncc.edu

Although primarily for undergraduate students, the Honors College coordinates applications for many national scholarships for advanced undergraduate and graduate study. These scholarships, including the Rhodes, the Marshall, The James Madison, The Barry M. Goldwater, the Jack Kent Cooke, the Phi Kappa Phi, and National Science Foundation Fellowships require extensive application procedures and are only awarded to the most outstanding applicants. Only students with exemplary academic records—combined with service and leadership—qualify for these highly selective graduate and, in some cases, advanced undergraduate awards. Most also require an on-campus review and institutional endorsement of completed applications.

Multicultural Academic Services

www.mas.uncc.edu

The **Office of Multicultural Academic Services**, while open to all students, provides academic support to students of African, Asian, Hispanic/Latino, Pacific Islander, and Native American descent. A sense of community, fostered by the Office, aids in recruitment, retention, and graduation from the University. The Office of Multicultural Academic Services serves as a clearinghouse for information and referrals to ensure access and long-term academic success of all students.

Services, for individuals and groups, include: secondary academic advising; tutoring in math, science and engineering; weekly study halls; mentoring; workshops; monitoring of academic progress; recognition of academic achievement; personal, cultural and leadership development; resources and referrals for students, faculty and staff; academic support for undergraduate and graduate students.

University Career Center

www.career.uncc.edu

The **University Career Center for Work, Service, and Internships (UCC)** offers comprehensive career services designed to assist undergraduate and graduate students in all stages of career development: career decision making, career planning, career employment, and reassessment. Experiential learning (EL) is a key component and all students are encouraged to take advantage of internship, cooperative education, 49ership, and other career exploration programs. With the UCC acting as the coordinating and academic support unit for experiential learning, 60-70 percent of all students at UNC Charlotte participate in a university-sanctioned career-related experience. The Center has over 140,000 student contacts annually but still offers ten personalized Career Coaches and Advisors (and four Peer Career Assistants) who serve as liaisons to each major and the university advising center for student one-on-one meetings.

The goals of the UCC are: (1) to help all students make and act on career decisions that maximize their potential and long-term development; to enable the timely involvement of students in experiential learning programs; (2) to engage students, faculty, and employers in quality experiential learning programs; and (3) to promote receptivity to and involvement with UNC Charlotte, the colleges, and the students among individuals and organizations outside the University. The UCC serves over 7,000 area and national employers, and also has developed co-op and 49ership programs abroad. Over 50,000 jobs and internships are handled through the office each year.

Services provided by the UCC range from individual career counseling and advising; résumé and cover letter critiques; and videotaped, mock interviews; to small group workshops

on such topics as résumé writing, effective interviewing, uncovering the hidden job market, and transitioning from college to the workplace. Other services include résumé referrals to employers, on-campus interviewing, career exploration through various experiential learning programs and a special topic freshman seminar, a career resources library collection, and seven major career fairs and events annually, including the Public Service Career Fair and Career Expo. The majority of services can be accessed online at www.career.uncc.edu; through the “My Future” section on the 49er Express at www.express.uncc.edu; or by registering in NinerJobNet, an online database maintained by the UCC. Online UCC links such as Career Search, Vault, Career Spots, Optimal Résumé, Optimal Interview, Vocational Biographies, H1-B Visa Database, and E-leads are added career information tools for students. A newsletter is published each semester to inform students about workshops, programs, and employers recruiting on campus. Students are encouraged to visit the UCC and to start their experiential learning program and career planning in their freshman year or first semester at the University. The UCC has received national recognition for its “state-of-the-art” program initiatives.

Part-Time Employment On-Campus. Offered by the Department of Human Resources at UNC Charlotte, the Student Employment Office (200-A King Building) assists students in locating on-campus employment opportunities. The University participates in the federal Work-Study Program and attempts to match students with jobs related to their academic interests. Students are encouraged to limit employment to no more than 20 hours per week to allow for success in a full 15-18 hour course load each semester. More information, including job openings, can be found online at www.hr.uncc.edu/students.htm.

Part-Time Employment Off-Campus. The UCC’s Job Location and Development (JLD) Program assists students in obtaining part-time, summer, and temporary employment off-campus. Some full-time jobs that do not require a degree are also listed. Job listings may be viewed online to registered students in Campus Professional. Jobs may include career-related positions in various fields such as education, business, entertainment, engineering, graphic design, and healthcare. The JLD Program is available to help students to earn money for their academic and personal expenses during their enrollment at the University.

University Center for Academic Excellence

www.ucae.uncc.edu

Designed to improve academic performance and foster meaningful learning experiences, the University Center for Academic Excellence provides services, programs, and materials to help students develop and refine thinking skills, utilize self-management skills, and learn course material more quickly and thoroughly while earning higher grades. Services include: (1) individual consultations regarding academic

concerns; (2) diagnostic assessment of learning styles and study habits/attitudes; (3) computer-assisted instruction for a variety of course subjects; and (4) a library of materials with books, DVDs, video tapes, and printed handouts outlining successful study/learning strategies. The Center collaborates with various colleges and programs on campus to promote success of undergraduate and graduate students. All services are free to enrolled UNC Charlotte students.

Dean of Students

www.dso.uncc.edu

The Dean of Students Office is a department within the Division of Student Affairs and serves as a key link between students and other areas of campus life. As the hub of the Niner Nation student experience, the mission of the Dean of Students Office is to serve the University community as a compass and advocate for student centered education built on integrity, citizenship and diversity.

Various programs are sponsored by the Dean of Students Office to promote opportunities for learning and growth during a student's college experience. The staff is responsible for advising and promoting the following programs: student government, Greek life, minority student support services, new student orientation, off-campus student services, women's programs, student conduct, volunteer services, Community Service Learning Community, religious affairs, and parent and family programs. In addition, the staff of student development professionals provide support for any student who has a grievance or concern about the University. The office also coordinates and assists with the settlement of academic and behavioral misconduct charges against individuals and student organizations.

The Dean of Students Office welcomes all students and values the concept of student involvement in leadership opportunities on campus. Leadership training offered within this department focuses on nine competencies: (1) interpersonal relationships, (2) critical thinking, (3) social justice, (4) ethics, (5) social responsibility, (6) leadership, (7) communication, (8) resource awareness, and (9) professional responsibility. Through these competencies, students often find themselves learning new skills and abilities that can help them become more productive and responsible citizens.

Each of the programs and services listed below provides excellent opportunities for students to incorporate classroom knowledge into practical situations. The Dean of Students Office is located in 217 King. For information, call 704-687-2375.

Student Conduct

Student Conduct promotes personal responsibility and encourages civility, integrity and a sense of community among UNC Charlotte students. The purpose of the student conduct process is to maintain a campus community conducive to a positive learning environment. Consistent with this purpose, intentional efforts are made to foster the personal, social and ethical development of those students whose behavior is in conflict with University expectations, both in and out of the classroom. The desired outcome of the student conduct process is to provide an educational opportunity by which individuals or groups can recognize the consequences of their actions and be held accountable for their choices. As part of their individual responsibility to the University community, all UNC Charlotte students are expected to be familiar with their rights and responsibilities as outlined in The Code of Student Responsibility, regarding behavioral violations, and The Code of Academic Integrity, regarding violations through academic coursework. Visit online at www.dso.uncc.edu/judicial and the Student Conduct section of this *Catalog* for more details.

Student Government

The Student Government Association (SGA) provides students with an early experience in governmental affairs. Students often find their work in student government a useful background for later public service. The University encourages student participation in its affairs and has student representatives on many faculty and administrative committees. The leaders of student government are committed to representing the student body and to developing students' awareness of the many facets of campus life. All regularly enrolled students, both full and part-time, are eligible to participate in student government. Visit online at <http://sga.uncc.edu>.

The Graduate and Professional Student Government (GPSG) is comprised of students from each graduate academic program. By virtue of enrollment, all graduate students are members of the GPSG. GPSG serves as an advocacy group for graduate student needs and concerns. All students are encouraged to join their departmental organization and participate in GPSG initiatives. Students may apply for limited travel grants through the GPSG. Visit www.sco.uncc.edu/gpsg for details.

Volunteer Programs

Volunteer Services helps students find community service opportunities through a clearinghouse containing listings of local non-profit agencies. A wide diversity of service activities is available, and the Volunteer Services staff helps students find an opportunity that matches their interests and skills. Volunteer Services also has a number of issue-based programs that focus on topics like hunger, education,

homelessness, literacy, and mentoring in which all UNC Charlotte students, faculty, and staff may participate. Volunteer Services sponsors special events such as Relay for Life, 49er Plunge, Food Recycling Program, Service in Action, Volunteer Fairs, and Into the Streets. Visit online at www.dso.uncc.edu/volunteer.

Family Programs

Parent and Family Programs are designed to provide communication between the University and family members of UNC Charlotte students in order to support student success, generate goodwill for the University, and promote an appropriate role for families within the campus community. Through collaboration with a variety of departments on campus, Parent and Family Programs provide resources to keep families connected to the University and equipped to support their student throughout the college experience.

Niner Nation Family is intended to strengthen the relationship we have with our students' families and increase communication with parents and actively involve them in the life of UNC Charlotte. Membership is open to all parents and family members of current students. To join, simply contact the Niner Nation Family Office at parents@uncc.edu or call 704-687-2635, or visit the website at www.parents.uncc.edu.

Minority Student Support Services

Minority Student Support Services is designed to assist and advocate for the needs of UNC Charlotte's under-represented populations. Through collaboration with a variety of offices on campus, the program focuses specifically on academic support, mentoring, social networking, ethnic and cultural development, leadership development, and personal growth.

Women's Programs strives to promote understanding, raise awareness, and address the needs of women in the UNC Charlotte community by offering a variety of programs to students, faculty, and staff. The goals of the Women's Programs Office is to support and serve women by celebrating their achievements and to advocate for a gender friendly environment. Women's Programs provides faculty, staff, and students with information and services about women; sponsors programs which address and educate the community regarding issues concerning women; and advocates for the rights of women in the fight to end domestic violence. Programs offered include: the Women's Leadership Conference, Take Back the Night, Clothesline Project, and Vagina Monologues. Visit online at www.dso.uncc.edu/women.

Off-Campus Student Services

Off-Campus Student Services supports students by providing informational resources about off-campus living and by working with campus departments to encourage University-wide support systems for off-campus students. Students who decide not to live in the residence halls can choose from a variety of apartment complexes, rental properties, or condominiums located near campus. Off-campus Student Services programs include Vendor Fairs, Coffee Brakes, Lunch Brakes, and safety presentations. Visit online at www.dso.uncc.edu/offcampus.

Dining on Campus

The University offers a variety of dining options on campus. For locations and available meal plans, please visit www.dineoncampus.com/uncccharlotte.

Educational Services

Library

The J. Murrey Atkins Library, located near the center of campus, is a beautiful state-of-the-art facility, physically housing over 1,046,000 bound books and serving as a repository of unique Special Collections materials and artwork. It is the largest research library in the Southern Piedmont region with accredited membership in ASERL (the Association of Southeastern Research Libraries). The Charles C. Hight Architecture Library was officially designated as a branch of Atkins in the 07/08 Academic year. Focusing primarily on 20th and 21st century architectural design, this library holds an array of resources, such as books, audio visuals, periodicals, Fifth Year and Graduate Thesis documents, materials, drawings, and plans.

Atkins Library continues to thrive technologically, offering free access to over 38,700 electronic journals, 64,000 electronic books, wireless network access from the Ground to Third floors, almost 250 public computer workstations and over 50 wireless laptops available to use in and out of the building. The Library also offers Atkins Express, an online book/article retrieval and delivery service offered for students, faculty, and staff, saving patrons precious time for study and research.

Our expert Research Librarians are available to students and faculty via chat, email, phone and even research consultation

meetings for deeper, subject-related study. Hundreds of Instructional Class Sessions are taught to students annually, empowering them with improved information literacy and research skills. There are also eleven group study rooms available, with over 12,000 bookings just last year, encouraging the collaborative study that is increasingly necessary with our growing academic programs.

Please visit <http://library.uncc.edu> for more information.

Computing

Information and Technology Services (ITS) manages the campus voice and data networks, centralized servers, University-owned computers, operating systems, and software to support teaching and learning, research and business processes. The campus has a robust data network that connects over 600 servers and approximately 6000 computers. Fifty percent of the campus features wireless network access. ITS maintains and supports the University's core administrative systems, performs application development, and administers and supports all of the University's central server resources. ITS provides development, consulting, and support services for the University web presence, its portal (49er Express), the University's e-learning system, and facilities and services in support of the University's research mission.

Student Computing is a unit within Information and Technology Services that works to ensure that students have access to computer equipment, software, and information needed to support their general academic efforts at the University of North Carolina at Charlotte. Student Computing manages the general-use computer labs in the Barnard building which are open 24/7. The labs house over 130 Internet-connected computers which provide access to email, network disk space, and a variety of applications. All current students are provided an email account, 49er Express account, and Novell account for their use while they are enrolled in classes at UNC Charlotte. Student Computing provides technical support through the Student Computing Help Center in Barnard, an online helpdesk tool located at <http://helpdesk.uncc.edu>, and via phone at 704-687-6400. Visit <http://labs.uncc.edu> for more information.

Writing Assistance

The mission of the **Writing Resources Center (WRC)** is multi-faceted. Based on the view that knowing and learning are fundamentally social, the WRC fosters an environment of active, collaborative learning outside the classroom. Its primary purpose is to provide one-to-one writing instruction to students from first-year to graduate in any discipline. Its goal is not to "fix" papers, but to teach students to become more effective writers.

The Center includes computing facilities that integrate word processing, research, tutoring, and assistive technologies.

Online tutoring extends writing instruction beyond daytime hours to serve nontraditional and distance education students. In addition to its web-based resources, the WRC houses a variety of writing-related instructional materials.

Consultation is available, on a limited basis, to support faculty in teaching writing across the curriculum. WRC staff give presentations and host workshops on topics such as avoiding plagiarism, documenting sources, peer response, and revision strategies.

The WRC also has an educational mission for its writing assistants. Staffed by undergraduate and graduate students from a variety of disciplines, the WRC offers teaching experience and leadership opportunities to tutors, many of them future educators, as they develop their own writing abilities and interpersonal skills. Both novice and experienced writing assistants participate in ongoing professional development in theory, research, and practice of writing pedagogy. Integral to that training, the WRC is a rich site for literacy research for students and faculty alike.

As a university-wide service invested in the teaching and learning of writing in every discipline, the WRC coordinates its efforts with other academic support services. The Center participates in University policy-making concerning writing and joins in the design and implementation of campus writing initiatives.

Tutorials begin on the hour and last for 45 minutes. Students may make appointments in advance. Walk-in consultations are available too. Faculty may also make student referrals to the WRC. In addition to its Fretwell 220 location, the WRC has a satellite location, Atkins Library109.

The Writing Project (WP) focuses on developing K-12 writing teachers using three interconnected components that are based on the National Writing Project model: 1) the summer invitational institute, 2) continuity programs for teacher consultants in the project, and 3) inservice programs with local school districts. The WP offers inservice teacher education as well as opportunities for K-12 teachers to conduct classroom-based research. Working in conjunction with the College of Education, the WP provides leadership in educating teachers as writers and teachers of writing.

Continuing Education

The Office of Continuing Education, Distance Education/Extension, and Summer Programs. Recognizing that learning must be a lifelong activity, the University provides opportunities for adults to pursue their continuing education through degree-related studies and special non-credit programs.

Non-credit short courses, seminars, workshops, and conferences for adults are offered through *Continuing*

Education. Specific programs are provided each year for the continuing professional education of accountants, managers and project managers in the public and private sectors, engineers, certified financial planners, human resource professionals, training and development specialists, paralegals, fire and rescue professionals, emergency medical specialists, and medical office and coding administrators. The Office offers a variety of courses to prepare individuals to sit for various exams, including the SAT, GRE, GMAT, and LSAT. The Office's Corporate Training staff design and deliver programs in-house to serve the employees of specific companies and organizations. The Office of Continuing Education is located at the Ben Craig Center and can be contacted at 704-687-8900.

Through *Distance Education/Extension*, courses for academic credit are offered at off-campus sites and via the Internet to serve citizens who live beyond easy commuting distance of the campus. Options for delivery include sending a UNC Charlotte faculty member to an off-campus location to teach a course in person, using one of two state-wide interactive video networks to link a UNC Charlotte faculty member on the campus in Charlotte with students attending class at remote locations throughout the state, and delivering courses online via the Internet. The Office of Distance Education is located in 1017 Colvard and can be contacted at 704-687-2222.

During the summer, the office schedules a variety of credit and non-credit programs, including academic enrichment camps for youth, on the campus, at approved off-campus sites, and via the Internet. The Office of Summer Programs is located in the former Alumni House and can be contacted at 704-687-4481.

Please visit www.ceesp.uncc.edu for specific information about the programs offered.

The **Office of Adult Students and Evening Services (OASES)** serves as a principal resource for nontraditional students. Services include general education advising, referrals, and assistance with forms and parking requests. Students can pick up and/or drop off information to be delivered on campus. OASES offers extended hours to serve students in Barnard 106 from 8 a.m. to 7 p.m., Monday through Thursday; 8 a.m. to 5 p.m. on Friday; and 9 a.m. to 1 p.m. on Saturday. Programs include orientation sessions, adult student scholarships, the Alpha Sigma Lambda Honor Society, the Non-Traditional Student Organization (NTSO), the Adult Mentoring Program for Students (AMPS), and the 49er Finish Program. Visit www.oases.uncc.edu or call 704-687-2596 for more detailed information.

Environmental Services

The **UNC Charlotte Experimental Ecological Reserve** is a 100-acre tract of land set aside on campus by the UNC Charlotte Board of Trustees as a permanent ecological reserve for use as an outdoor classroom and laboratory. The reserve includes a floodplain forest, pine stands, mixed pine-hardwood forest, and a relatively undisturbed 10-acre watershed of oak-hickory forest.

The **UNC Charlotte Rocky River Wildlife Refuge** is a 46-acre natural area located east of Charlotte in Stanly County. Its purpose is to preserve the natural features of the area and allow research and field trips to study the plants and animals within the North Carolina slate belt formation.

The **UNC Charlotte Botanical Gardens**, located on campus, consist of the McMillan Greenhouse, the 7-acre Van Landingham Glen, and the 3-acre Susie Harwood Garden. The mission of the gardens is to promote the knowledge and appreciation of plants for educational, environmental, and aesthetic purposes. The gardens were begun in 1966 by biology professor emeritus, Herbert Hechenbleikner to serve as a living classroom and have evolved into a multifaceted campus and public resource. Collections include orchids, carnivorous plants, succulents, native plants, tropicals, and hardy outdoor plants. The outdoor gardens are open seven days a week, and the greenhouse is open Monday through Saturday, 10-3 and Sundays 1-4. Students and the public are invited to visit, free of charge. More information can be found online at <http://gardens.uncc.edu>.

Recycling services are coordinated by the Office of Waste Reduction and Recycling (704-687-2137) within Facilities Management. The University's recycling program, initiated by students in 1990, currently recycles 31% of the solid waste generated on campus, including approximately 40 different materials. Residence halls are equipped with outdoor recycling centers, recycling containers in trash rooms or lobbies, and a small recycling bin in each room. Toner cartridges, aluminum cans, plastic and glass bottles, computer paper, newspapers, magazines, and cardboard can be recycled at the residence halls. In addition to the above materials, Styrofoam peanuts, transparencies, and hard and soft back books can be recycled in the academic and administrative areas.

The recycling program provides educational sessions for students, faculty, and staff. The program coordinates and sponsors the annual UNC Charlotte Earth Day Environment Festival and the biannual Campus Clean-Ups along with various educational programs throughout the year. The Office of Waste Reduction and Recycling offers students a chance to actively embrace their environmental responsibilities and to demonstrate concerns through volunteer and employment opportunities. To volunteer, contact the environmental educator at 704-687-4283.

These and other waste reduction and recycling programs help UNC Charlotte in its effort to meet North Carolina's 40% waste reduction goal. For more information about UNC Charlotte's waste reduction and recycling activities, view the website at www.uncc.edu/recycling or call the office at 704-687-4283 or 704-687-3890.

Health & Well-Being Services

Student Health Center

The Student Health Center's mission is to promote healthy students by providing health care, education and outreach services. It provides primary medical care, disease prevention, health education, wellness promotion, and various specialty services, including allergy injections, immunizations, gynecology, physical therapy, and HIV screening to all registered UNC Charlotte students. The Student Health Center also provides a full-time psychiatrist and a registered dietician. The Student Health Center is staffed by a team of physicians, physician assistants, and nurse practitioners. The pharmacy fills prescriptions from outside physicians as well as the Center's own doctors.

Appointments are strongly recommended; this eliminates long waits and assists students in scheduling medical services around class schedules.

Seriously ill students and emergencies are referred to local hospitals or other appropriate medical facilities.

The Student Health Center also provides after hours nursing advice for the students at UNC Charlotte when the Student Health Center is not open including weekends and holidays.

The student health fee covers many of the costs for services. Additional fees are charged for x-ray, pharmacy, laboratory, and gynecology services, injections, and special procedures. Fees for service may be paid by cash, check, credit card, or transferred to the student's University account. Fees are subject to change. For more information, visit the Student Health Center website or call 704-687-4700.

Most students are required to either demonstrate proof of insurance or to purchase a University Student Health Insurance Plan. Full details may be found online at www.studenthealth.uncc.edu. For University Immunization Requirements, please see the section entitled "The Graduate School" in this *Catalog*.

Counseling Center

The Counseling Center at UNC Charlotte supports the academic, personal, and interpersonal development of UNC Charlotte students by providing short-term individual and group counseling; consultation for faculty, staff, parents, and students; and educational programs to the campus community. Consistent with the academic mission of the University, the Center also serves as a training site for graduate students in psychology and counseling, and encourages scholarly activity and professional development of staff.

Information shared by student clients is confidential in accordance with guidelines established by the American Psychological Association and the laws of the state of North Carolina. All currently enrolled students are eligible for an initial assessment. This first session helps both the student and counselor decide how Counseling Center services might best serve a student's needs. These services may consist of individual or group counseling at the Counseling Center or a referral to an on-campus or off-campus service.

Counseling is provided to help a person cope with difficult situations and conflicts; improve interpersonal relationships; adjust to college and other life transitions; and overcome specific psychological difficulties such as depression, anxiety, eating disorders, and substance abuse. Groups are offered each semester, some of which are short-term structured groups that address a particular theme (such as anxiety reduction). Other groups are ongoing and unstructured.

Outreach and consultation are important services provided by the Counseling Center. Staff members are available to consult with faculty, staff, parents, and students on topics such as enhancing communication, improving the learning environment, and helping a particular student with a problem. Outreach activities, usually focusing on some aspect of personal, interpersonal, or group development, include programs conducted outside the Counseling Center to meet the needs of a group or organization.

Initial counseling appointments may be arranged by visiting the Counseling Center at 158 Atkins or by calling the Center at 704-687-2105. More information about the Counseling Center and its services can be obtained by visiting www.counselingcenter.uncc.edu.

Housing

Graduate as well as older undergraduate students (non-traditional) often have needs that are different from other undergraduates.

To help accommodate those needs, the Department of Housing and Residence Life has set aside a limited number of apartment spaces in Hunt Village for graduate students and our non-traditional undergraduate students.

For assistance in applying for graduate or non-traditional housing, please contact the Assignments Office or simply check the appropriate box on the Application for Housing for placement consideration found online at www.housing.uncc.edu.

International Programs

www.oip.uncc.edu

The **Office of International Programs (OIP)** assists the University of North Carolina at Charlotte and the surrounding community in responding to the numerous responsibilities and emerging opportunities created by an increasingly interdependent world. On campus, it seeks to make international understanding and global awareness a fundamental part of the curriculum and an integral part of campus programming.

Various **Campus Events** are sponsored independently and in cooperation with other departments and agencies on campus. They include the annual International Festival, International Education Week, Study Abroad fairs, International Women's Day, International Education awards for faculty and students, and activities associated with the Mu chapter of Phi Beta Delta Honor Society for International Scholars.

Public Service. The Office of International Programs seeks to initiate and respond to the international needs and interests of the community. Current programs include: 1) Community Forums – symposia on topics of current international interest; 2) Great Decisions – an annual series of lecture/discussions during the months of February and March on key policy issues; and 3) Cross-Cultural training – individually designed workshops that focus on appreciation for other cultures and development of skills in effective communications across cultures.

The Office of International Programs serves as a center of leadership and responsibility for the international role and mission of the University. It is comprised of related units that function together towards creating an international perspective in all facets of campus development. OIP includes the **Office of Education Abroad**, the **International**

Student and Scholar Office, the **English Language Training Institute**, and **Intercultural Outreach Programs**. In addition, OIP is closely affiliated with the **World Affairs Council of Charlotte**.

The **Office of Education Abroad (OEA)** at UNC Charlotte is committed to providing quality, cost-effective educational opportunities for students to enhance their learning in an experiential environment abroad and to supporting faculty initiatives in creating such programs to supplement their curriculum objectives.

Students are encouraged to take advantage of the opportunity to have an educational experience through study or experiential learning abroad. OEA develops and maintains exchange relationships in multiple countries throughout the world and is an active member of the International Student Exchange Program (ISEP) which allows students access to additional programs from a worldwide framework of exchanges. Students have the option of year-long, semester, summer or short-term programs.

In addition to making progress toward their degree requirements, students have the opportunity to test theoretical principles in real-time, challenge their assumptions about different cultures and explore their own relationship with the global landscape.

The **International Student/Scholar Office (ISSO)** provides information, services, and programs that help international students and visiting scholars achieve their individual educational and personal goals and also fosters an appreciation for a culturally diverse learning environment in the larger UNC Charlotte community.

Over 800 non-immigrant international students representing over eighty countries around the world study at UNC Charlotte. They are supported through orientation programming, individual advising and assistance with immigration document processing. Programs to encourage international student and U.S. American student interaction are also supported through ISSO. These include an International Coffee Hour, Friendship and Culture Exchange Program and the International Club at UNC Charlotte.

The **English Language Training Institute (ELTI)**, established in 1978, prepares international students for academic study at UNC Charlotte or other U.S. colleges and universities by introducing and refining the English language and cultural adaptation skills the students will need to succeed in their academic careers.

ELTI offers seven levels of English language instruction to over 100 students from more than 20 countries each semester. In addition to 20-24 hours of class each week, students visit academic classes, meet with U.S. conversation partners, and tour area schools and sites of cultural interest. On average, students stay for a least two semesters.

Intercultural Outreach Programs (IOP) initiates a wide

array of academic and professional development programs in conjunction with an intensive and structured immersion experience in American culture and language for international groups who wish to achieve peak performance in the international arena.

IOP also facilitates specialized faculty development programs and practical training for international interns. Each experience is custom-designed and integrated with experiential learning activities; cultural, social and recreational events; as well as opportunities for interaction with the Charlotte and University communities.

Programs for domestic groups are also initiated and administered through IOP. Professionals who wish to go abroad may broaden their global perspective and enhance their professional skills through coordinated opportunities to exchange ideas and develop cross-cultural relationships with colleagues in other countries; expand their professional knowledge, and, see their own profession from a different perspective. Professional development is also provided for local corporations with multicultural work forces at home and/or operations abroad.

The **World Affairs Council of Charlotte (WACC)** was founded in 1983 as an outreach program of UNC Charlotte and its Office of International Programs. By serving as a regional center for education and discussion of world affairs, WACC seeks to provide leadership for global thinking, believing that a broad perspective is necessary for effective competition in the global economy and for responsible citizenship in an increasingly interdependent political world. The WACC recruits internationally renowned speakers to address topics ranging from economics to globalization to foreign policy. This past year's speakers included: Pulitzer-Prize winner Tim Weiner; U.S. Senior Senator Chuck Hagel; and Russian expert Dr. Marshall Goldman.

WACC educational outreach programs have directly benefited over 700 teachers and almost 70,000 students. WACC is a non-profit, non-partisan organization supported by funding from individual and corporate member dues, foundations, and contributions.

Out in the Community

The University recognizes that its mission reaches beyond the borders of the campus to the surrounding region and the state. The University touches many facets of community life and serves as a catalyst for development of a regional approach to solving problems in education, economic development, transportation, the environment, cultural amenities, and the quality of life. Faculty, staff, and students have made a significant impact on the region through research, historic preservation, planning, the arts and literature, and the delivery of government and social services.

The **Office of Alumni Affairs**, located in the Harris Alumni Center at Johnson Glen, serves as the liaison between the University and the alumni. Some of the most rewarding experiences of University life begin at graduation when former students enter the Alumni Association. Alumni are an essential part of our University and are among the University's most valued supporters. Responsibility for strengthening and maintaining the relationship between the University and its alumni is vested in Alumni Affairs.

Programs of the Alumni Association include the regional, local, special interest and collegiate chapters, homecoming activities, networking socials, athletic support, and sponsorship of the Student Alumni Ambassadors.

The Office seeks to maintain lifelong contact with all graduates. Graduates are encouraged to become active in the Alumni Association and to notify the Office of Alumni Affairs of address changes, employment information, and other significant events, such as marriages, births and honors. Today, UNC Charlotte boasts more than 80,000 living alumni and adds 4,500 to 5,000 new alumni each year. We are a non-dues paying organization, and the only requirement for membership is that you be an alumnus of the University.

More information about and for alumni (including benefits) can be found online at www.unccharlottealumni.org.

The Office of University Development. Known traditionally as a "state-supported institution," UNC Charlotte is more accurately a "state-assisted institution," as the University depends on non-state resources for more than half of its operating needs. Philanthropy is critically important, providing the critical margin of excellence so that the University can fulfill its threefold mission of education, research and public service.

The Office of University Development plans and implements the private fund-raising and related efforts of the University and the Foundation of The University of North Carolina at Charlotte, Inc. Its functions include annual giving, gift planning, major gifts, corporate and foundation relations, gift processing, alumni/donor records, research, donor stewardship, prospect coordination and clearance, and campus-wide development services.

The Foundation of The University of North Carolina at Charlotte, Inc. is the 501(c)(3) public charity, incorporated in 1965 to benefit UNC Charlotte through asset management and fund raising. University employees in the Office of University Development in the Division of Development and Alumni Affairs and in the Office of Sponsored Programs in the Division of Business Affairs perform the fund-raising and business functions of the Foundation, respectively. In exchange, the Foundation transfers funds to UNC Charlotte to enhance its teaching, research, and service missions.

Public Relations is the official communications channel through which the University disseminates information to its various publics. The office has three major functions: (1) external media relations; (2) internal communications; (3) official University publications that are distributed to off-campus audiences; and (4) executive communications for the chancellor and vice chancellor for university relations and community affairs. The office works with media outlets throughout the country on news and feature coverage about University programs and its people. Additionally, the staff writes and distributes tip sheets and news releases about campus activities, as well as faculty and student achievements. The office produces a weekly newsletter, *Campus News*, to inform faculty and staff about campus activities; publishes the official university magazine, *UNC Charlotte*, which is distributed to alumni and friends of the University, and contributes writing and editing for publications related to special events.

Broadcast Communications provides media production services to the University community, as well as distance education and videoconferencing support. In addition, this department operates or supplies content to a variety of distribution outlets through sources such as Time Warner Cable, AT&T U-verse, iTunesU, Facebook, YouTube and the UNC Charlotte main website. Furthermore, the staff produces several ongoing series on a variety of topics such as: “Alumni Today,” a program that focuses on the current activities of Alumni and how their UNC Charlotte education still impacts their lives today; “The 49ers Insider,” a weekly program that brings you interviews, highlights, special features and the schedule of events of all 16 teams in the Charlotte 49ers Department of Athletics; “Campus Conversations,” a program that highlights the wide variety of programs, activities and events at UNC Charlotte; “Faculty Research,” a show designed to let you hear from the researchers themselves as they describe current and future projects; and “Medicine/Business & Society,” two related series that discuss various topics in the fields of medical ethics and business ethics that affect everyone.

Parking and Transportation

Parking and Transportation Services (PaTS) is charged with the responsibility of providing parking and transportation service for UNC Charlotte students, faculty, staff and visitors.

The PaTS office is located in the Facilities Operations/Parking Services Building (#23 on the campus map). All campus parking requires the purchase and display of a University parking permit or payment at meters or in the visitor decks. Parking permits may be purchased online at

www.parking.uncc.edu. Permits do not guarantee proximity parking, nor do they reserve a specific parking space in any lot or deck.

Night Permits for evening-only students are available by the semester or by the year. In addition, a limited number of reduced fee permits are available for commuter students and staff who are willing to park in a remote lot (6A) and utilize the free Campus Shuttle Transportation.

Copies of the Campus Parking Rules and Information are available from the Parking and Transportation Services office and on our website. For information on fees for motor vehicle registration and parking, see the section on Financial Information in this *Catalog*.

Campus Shuttle Transportation is available Monday through Thursday from 7:30 a.m. to 10 p.m., and Fridays from 7:30 a.m. to 6 p.m., when classes are in session. Shuttle buses are provided by PaTS through the Charlotte Area Transit System (CATS) and run to and around all main areas of campus, providing safe, reliable, ADA compliant transportation. Schedules and maps are available online at www.parking.uncc.edu. For additional information, please contact the PaTS Office at 704-687-4285.

SafeRide is a new service provided by Parking and Transportation Services that operates whenever the University is open. SafeRide’s purpose is two-fold:

- 1) *Monday through Friday from 7:30 a.m. to 6:00 p.m.*, SafeRide provides service throughout the inner core of campus for persons with temporary and permanent mobility disabilities. Riders must register for the service through the Office of Disability Services at 704-687-4355. Forms are available on the SafeRide Web site at www.saferide.uncc.edu and at the Office of Disability Services or the PaTS Office.
- 2) *Sunday through Thursday from 6:00 p.m. to 12:30 a.m.*, SafeRide provides an ADA accessible safety escort service, in conjunction with the Campus Shuttle Transportation Service. SafeRide departs from the South side of the Atkins Library on the hour and half-hour, serving academic buildings, housing areas, parking lots and parking decks within the UNC Charlotte Campus. SafeRide evening service requests are made by calling Campus Police dispatch at 704-687-2200.

The **Charlotte Area Transit System (CATS)** provides bus transportation to and from campus via route 11U (from the Uptown transportation center and North Tryon Street) and route 29 (with service to Eastland Mall, Barrington/Shamrock Drive areas, Sharon Amity, Cotswold Mall to SouthPark Mall). Service is provided on a regular schedule, connecting with established routes throughout the city. Brochures containing detailed information regarding routes, schedules and fees may be obtained in the Parking and Transportation Services Office, or by calling the Charlotte Transit Authority at 704-336-3366. Fees are set by Charlotte Transit and are subject to change. Maps for

CATS can be found online at:
www.charmeck.org/Departments/CATS.

Performing Arts

Created in 1990, the Departments of Dance, Music, and Theatre serve the educational needs of students and the cultural needs of Charlotte and the University Community. It is the mission of these three departments to prepare students for arts-related fields by integrating excellence in instruction and artistic creativity within a broad professional landscape. Thus, they seek to define themselves as a cultural laboratory which engages the university, the community of scholars, the performing arts industry, and the world.

Robinson Hall for the Performing Arts is home to the Departments of Dance, Music, and Theatre at UNC Charlotte. Opened in November 2004, the facility serves as both the University's premiere performing arts venue and a pre-professional training ground for students. Throughout the academic year, student productions and guest artist performances offer a variety of theatre, dance, choral music, bands, and jazz concerts.

Within Robinson Hall are the **Anne R. Belk Theater** and the **Lab Theater**. The main stage space, the Anne R. Belk Theater, is a proscenium-style house which seats 325. Up to forty-five different performance events can take place in the theater over the course of an academic year. The theater's orchestra, mezzanine, and box seating offers patrons an environment that is both intimate and elegant. The flexible Lab Theater space can accommodate 90 to 125 patrons for a unique theatrical experience.

The productions and concerts at Robinson Hall are student productions, with the exception of the guest artist series. With their focus on educating future actors, directors, playwrights, musicians, dancers, technicians, and composers, the departments are committed to allowing students as many performance, design, conducting, directing, and choreographing opportunities as possible. For details and upcoming performances, please visit www.performances.uncc.edu.

Research

www.research.uncc.edu

The **Office of the Vice Chancellor for Research and Federal Relations** provides direction and leadership for the development of research and creative activity at the

University and the infrastructure that supports those activities. The Vice Chancellor coordinates federal and congressional relations and oversees five support offices: the Office of Proposal Development, the Office of Research Services, the Office of Technology Transfer, the University Vivarium, and the Small Business and Technology Development Center.

The **Office of Proposal Development (OPD)** works closely with faculty and funding agencies to identify opportunities for proposal development, facilitate the formation of proposal teams, and provide a wide range of services to help faculty achieve their research goals, consultation on writing and funding strategies, and proposal editing.

The **Office of Research Services (ORS)** provides services for the review and submission of proposals to funding agencies, including the interpretation of guidelines, preparation of budgets, and mailing and tracking of proposals, as well as post-award management support. ORS coordinates research-support efforts with college research officers and is responsible for federal compliance.

The **Office of Technology Transfer (OTT)** provides services for the review, protection, and management of University-based intellectual property, and commercializes intellectual property through licensing services. OTT builds and maintains strategic partnerships with local and state-based economic development agencies; assists and mentors faculty and students with new business start-ups; provides outreach services in the areas of entrepreneurship, new business creation, intellectual property management, and venture capital financing; and acts as a conduit to industry for sponsored research and technology commercialization.

The **Small Business and Technology Development Center (SBTDC)** is one of 17 University-affiliated offices of The University of North Carolina's business and technology extension service and is operated in partnership with the US Small Business Administration. SBTDC specialists provide management counseling and educational services to small and mid-sized businesses and also help business owners and managers, economic and community development organizations, education institutions and not-for-profit organizations develop strategies and action plans to gain competitive advantage. The SBTDC helps clients successfully compete for federal, state, and local government contracts; provides assistance with export financing; and provides research and marketing support services, primary research on small business needs and economic impact, and special projects such as small business incubator feasibility studies.

The **Charlotte Research Institute (CRI)** is the portal for business-university partnerships at UNC Charlotte. Regionally, CRI works with the community and the campus to accelerate technology commercialization and the growth of entrepreneurial ventures. Globally, CRI develops intellectual capital through collaborations with industry, government and academia. New business and research ventures, university partnerships with regional and national

enterprises, and CRI spin-off companies all draw research and businesses to the region and spur economic growth.

Innovation and entrepreneurship are strongly supported by CRI's Ben Craig Center business incubator (BCC). The incubator program, business advisory services, and education events offered by the BCC support dozens of companies each year. BCC focuses on community businesses and University startups that benefit most directly from proximity to expertise, services, and equipment that only the BCC and the University can provide. In addition, the Small Business and Technology Development Center located at Ben Craig Center supports hundreds of small businesses each year.

Science and engineering ventures at CRI are driven by the internationally known results of its research centers in Precision Metrology, eBusiness Technology, and Optoelectronics. CRI's research vision continues to grow with emerging research initiatives that include bioinformatics, biomedical engineering systems, energy production and infrastructure, information security, motorsports and automotive engineering, nanoscale science, and translational research. With facilities on the Charlotte Research Institute Campus and at the North Carolina Research Campus in Kannapolis, CRI helps companies initiate new partnerships at UNC Charlotte and offers a variety of opportunities to engage talented faculty and make use of specialized resources available at UNC Charlotte.

The Center for Precision Metrology is focused on precision engineering and measurement including research in manufacturing processes and quality assurance for mechanical parts to within a millionth of a meter. New state-of-the-art facilities include clean rooms and multiple metrology labs. Research efforts have included high-speed machining, specialized sensors, aerospace industry applications, and have attracted companies such as Caterpillar, Mitutoyo, and Boeing for collaboration. The center also includes a group focused on motorsports and automotive research with collaborative partnerships with area race teams and NASCAR. The center has been recognized as a National Science Foundation Center of Excellence in New Industry Collaboration and in Nanoscale Science and Engineering.

The Center for eBusiness Technology collaborates with Bank of America, Wachovia, and other financial institutions to solve industry issues pertaining to technology applications. These applications include: information privacy and security, intelligent data analysis, systems integration, information visualization, as well as emerging research in Bioinformatics, Visual Analytics, and Homeland Security. The center has the distinction of being a "National Security Agency Center for Information Assurance Education." Recently, the Center also was funded as a Regional Visualization and Analytics Center by the U.S. Department of Homeland Security.

The Center for Optoelectronics and Optical Communications includes research areas in: design and fabrication of photonic devices, integrated optical circuitry, assembly and packaging of optical systems, optical materials, methods for precision

optical metrology, and optical imaging and inverse methods for wave front synthesis. The center has successfully allied with the Massachusetts Institute of Technology (MIT), Duke University, The Carolinas MicroOptics Triangle, and the North Carolina Photonics Consortium. A respected leader in the discipline, the center has continuing support from the Defense Advancement Research Projects Agency (DARPA).

The Bioinformatics Research Center conducts multi-disciplinary research involving the physical and life sciences, computer science, and mathematics and statistics with specific focus in the areas of functional genomics, statistical genetics, and proteomics. Projects underway include work in mechanisms of alternative gene splicing, new approaches to the analysis of microarray data, and the use of systems analysis techniques to understand gene-gene interactions. The center has taken a leadership role in developing Bioinformatics programs in collaboration with the developers of the North Carolina Research Campus, a billion-dollar, 350-acre research park that will be home to the research programs of a large number of private biotechnology companies as well as university and medical research programs.

The Center for Biomedical Engineering Systems addresses complex problems in healthcare in the Charlotte community and beyond. The center builds research and development collaborations between researchers within UNC Charlotte's Colleges of Engineering, Liberal Arts and Sciences, Health and Human Services, and Computing and Informatics; local healthcare institutions (including Carolinas Medical Center, Charlotte Orthopedic Research Center, and Presbyterian Hospital); and corporations in the Charlotte metropolitan area to solve biomedical engineering problems. The center's research is focused in four primary areas: (1) biomedical support systems; (2) biomedical modeling, imaging, and processing; (3) biomechanics and mobility research, and biomedical instrumentation.

The Energy Production and Infrastructure Center (EPIC) targets innovation in technologies associated with generation and distribution of reliable, affordable and clean energy sources. UNC Charlotte is partnering with the energy and infrastructure industry to create a scientific and technical resource for the energy industry and a training ground for the energy workforce. EPIC is an interdisciplinary research center with a strong emphasis on collaboration among the civil, environmental, computer, and electrical engineering disciplines.

Life Science Research is now developing strongly in four focus areas. *Translational Research* is designed to join basic science research with patient care to develop novel treatments and therapies for diseases and healthcare problems. *Health Services Research* harnesses the power of visual analytics for data warehousing/mining of large scale databases (vital statistics, hospital discharges) for decision support for both clinical and public health research domains. *Kinesiology Research* is focused on biodynamics and exercise physiology. *Ecology and Environmental Biology Research* is geared toward

toxicology, bacteriology and biotechnology.

More information about the Charlotte Research Institute can be found online at www.charlotteresearchinstitute.com.

The **UNC Charlotte Urban Institute** is the University's applied research and community outreach center for urban and regional affairs, connecting faculty and students with community organizations and public institutions working on significant public policy issues in the 14-county, 2-state region surrounding Charlotte. Founded in 1969, the Institute has provided during its 40-year tenure a wide-range of services, including technical assistance and training related to operations and data management, public opinion surveys, land-use and natural resources consulting, economic development research and community planning to meet the needs of the region and its citizens. The Institute's continuing focus has been a multidisciplinary social sciences approach to research, outreach and training to support informed decision-making in the region. Its ongoing programs, Centers and Divisions include:

- The *Charlotte Regional Indicators Project* compiles objective, reliable, and relevant measures for the greater Charlotte region on indicators important to the region's quality of life. Organized in then theme areas, and measured over time and compared to state or national data, the indicators provide policy-makers, civic leaders, and the public with a solid foundation for engaging in efforts to address the region's social, economic, and environmental challenges.
- The *Center for Transportation Policy Studies* is dedicated to the research and study of transportation issues and transportation related policy. The Center conducts research and policy analyses that result in efficient and cost effective investments and sound decisions for developing and maintaining multimodal transportation systems and services.
- The *School Services Division* focuses on planning and technology issues related to school operations, data management and training. A major on-going project involves providing software support and training for a statewide computerized school bus routing project called TIMS (Transportation Information Management System). As part of the TIMS project, the School Services Division provides support for public school districts in 40 of the 100 counties in North Carolina.

The **Institute for Social Capital** was created to serve as a link between community-based government and non-profit agencies and organizations serving children, youth, and families in order to facilitate information sharing between these groups, with the broader goal of fostering research and data-based community decision-making. In addition, the Institute was designed to link the community with University researchers with expertise in a wide range of areas involving children, youth, and families. The Institute's mission is to provide social resources that advance University research and increase the community's capacity for data-

based planning and evaluation of programs. The University of North Carolina at Charlotte Institute for Social Capital, Inc. is a wholly-owned subsidiary of the Foundation of the University of North Carolina at Charlotte. More information can be found online at www.socialcapital.uncc.edu.

Safety

Police and Public Safety services to the University community are provided 24 hours a day, seven days a week. University Police Officers are sworn, North Carolina State Certified Law Enforcement Officers.

The Administrative Offices of Police and Public Safety are located at the new Facilities Management and Police Building on Cameron Boulevard near Mary Alexander Road; the Police Telecommunication Center is still at its existing location in the King Building on campus. This agency is responsible for crime prevention, enforcement of laws and regulations, protection of life and property, preservation of peace, apprehension of criminals, and Lost and Found property.

Nearly 200 emergency "Blue Light" telephones are located throughout the campus to report suspicious activities, to summon police or medical assistance, and to request safety escorts (available 24 hours a day). Additionally, departmental representatives can conduct personal safety presentations to various audience sizes and are interested in working with students on academic, civic, and other projects related to law enforcement and community concerns. For more information, please visit www.police.uncc.edu.

It is the mission of the **Safety and Environmental Health Office** to support the University by working with all University community members to provide a safe and healthy working, teaching, learning and living environment. This is accomplished by providing high quality, responsive customer focused safety and environmental health services to the campus community. It is our responsibility to develop occupational safety and environmental health programs (i.e., Accident Prevention, Life Safety, Workers' Compensation), maintain appropriate accident documentation, conduct safety inspections of all facilities and operations, audit safety programs, maintain all regulatory required reports, and generally work to reduce the risks of illness or injury in the University community.

The Safety and Environmental Health program at UNC Charlotte is designed to promote an atmosphere of safety and health awareness through training and employee involvement. The participation and earnest cooperation of all faculty, staff, students, and visitors are actively encouraged.

All members of the University community share the responsibility to provide and maintain a safe and healthful campus environment and to reduce or eliminate known hazards. Each individual is expected to exercise appropriate care in the conduct of his or her activities to preserve the safety and health of self and others. For more information, please visit www.safety.uncc.edu.

Sports and Recreation

The Charlotte 49ers Department of Athletics provides competition in 16 intercollegiate varsity sports for men and women. Each sport competes under the governing powers of the National Collegiate Athletic Association (NCAA) at the Division I level, which is the highest competitive level for collegiate varsity sports. Scholarships are available for all varsity sports, male and female.

Male student-athletes compete in eight sports: baseball, basketball, cross-country, golf, soccer, tennis, indoor track and field, and outdoor track and field. Female student-athletes also compete in eight sports: basketball, cross-country, soccer, softball, tennis, volleyball, indoor track and field, and outdoor track and field.

The Charlotte 49ers recently joined the Atlantic 10 Conference with play in the league beginning in 2005-06. The Atlantic 10 sponsors championships in each of the 49ers' 16 sports. The Atlantic 10 is made up of 14 schools: Charlotte, University of Dayton, Duquesne University, Fordham University, George Washington University, La Salle University, University of Massachusetts, University of Rhode Island, University of Richmond, St. Bonaventure University, Saint Joseph's University, Saint Louis University, Temple University and Xavier University. Atlantic 10 tournament champions in baseball, men's and women's basketball, golf, men's and women's soccer, softball, men's and women's tennis and volleyball receive automatic bids to the NCAA post-season tournaments.

Each of the 49ers teams, except golf and cross-country, competes on campus in home competition. The basketball and volleyball teams compete in Halton Arena, the soccer and track and field programs compete at the Irwin Belk Center, tennis teams compete at the D.L. Phillips Athletic Complex, and baseball and softball teams compete at the Robert and Mariam Hayes Stadium.

For more information about the Charlotte 49ers and Athletics at UNC Charlotte, please visit <http://charlotte49ers.cstv.com/>.

IMPORTANT: UNC Charlotte students have free admission to all regular-season home athletic contests with proper University identification.

Recreational Services develops and conducts programs that provide opportunities for University students and faculty/staff members to participate in recreational activities. Five major program areas offer a variety of structures in which members of the University community may pursue recreational interests. *Intramural tournaments and events* are scheduled throughout the year for individual, dual, and team participation. The tournaments and events are organized to provide separate competition among coeducational, men's, and women's teams. *Sport Clubs* provide an opportunity to participate in a single sport on a continuing basis. Approximately thirty clubs, ranging from equestrian to lacrosse to tennis, are active each semester. *Fitness and Wellness* opportunities include group fitness, mind/body classes and personal training. Three major *Special Events* are offered each year, RecFest, Homecoming 5K Run/Walk, and a Spring Golf Tournament. The Special events are open to the public and may involve food, games, prizes, entertainment, and competition. In addition to structured sports programs, the division promotes the concept of informal recreational use of athletic facilities through the *Open Recreation Program*. For more information, please visit www.recservices.uncc.edu.

The **Belk Gymnasium** features basketball, volleyball and badminton courts, an indoor swimming pool, racquetball courts, a weight room, and lockers for students, faculty, and staff. It also houses classrooms and an auditorium for audiovisual presentations.

The **James H. Barnhardt Student Activity Center (SAC)** is a multi-purpose facility designed to meet the diverse social, cultural, and recreational needs of students at UNC Charlotte. The SAC is home to the Halton Arena, a 9,000 venue hosting athletic events, concerts, lectures, and a variety of other university functions.

Retractable seating in the area folds back to reveal four recreational courts that may be used for intramural sports, free-play, sports camps, or for special events including job fairs, trade shows, etc. Other recreational offerings include a state-of-the-art weight room, aerobics studio, indoor track, and indoor climbing wall. In addition to the physical fitness and wellness facilities, the SAC also serves as a meeting place for students and the campus community. The first floor of the SAC is home to a spacious food court with dining options and open-air lounge space, and the third and top floor of the SAC is comprised of a large and gracious hospitality area that can be sub-divided into five separate meeting salons. Adjacent to the hospitality area is the campus catering kitchen, serving the special events in the SAC as well as the remainder of the campus.

Student Activities

The Office of Student Activities (OSA) is a department within the Division of Student Affairs, which works to enhance the growth and development of students directly and indirectly by planning, advising, supporting and implementing a variety of programs, products and services. OSA includes Campus Activities Board, Student Media, Center for Leadership Development, Multicultural Resource Center, Venture, Student Organizations and Niners on the Weekend. With the exception of Venture, our offices are located in the Student Union. Venture is located in the Cone University Center. See below for a full description of all units of OSA. If you're not sure how or where to get involved, let us help! For additional information, please call 704-687-2521 or visit <http://studentactivities.uncc.edu>.

Campus Activities Board

The Campus Activities Board (CAB) is the largest student programming organization on campus and is responsible for planning diverse, quality events for the University community. CAB offers over 100 programs a year and works to enhance and unify the University community by planning social, cultural, educational and recreational events that complement the university's academic mission. Founded early in the history of UNC Charlotte, CAB maintains a vital role in fostering 49er spirit and traditions through popular programs such as Week of Welcome, Week of Madness, Homecoming, and more.

CAB is located on the second floor of the Student Union. For more information, visit <http://cab.uncc.edu> or call 704-687-2450.

Student Media Productions

The Student Media Board is the governing body for Student Media. It is comprised of students and administrative staff members, as well as representatives of the various student media.

The University Times is the campus newspaper, published every Tuesday and Thursday, and offers campus news and journalism experience for students. The newspaper provides a vital service to the entire University community by keeping readers informed of issues of common concern and interest. Family members may keep informed with the University's news by calling 704-687-2663 and ordering a subscription to *The University Times*.

Niner Online is the university community's home in cyberspace. UNCC news, sports, and feature stories are posted several times each week. Students can sign up to have the headlines emailed to them throughout the week or anytime breaking news is happening. Students gain

experience with Internet publishing and writing by working with NinerOnline. Visit the site at www.nineronline.com.

Media Marketing is the sales and promotions branch of Student Media. The department solicits advertising and coordinates promotion for UNC Charlotte's student publications. Media Marketing offers real world experience and internship opportunities for business, marketing, and communication careers.

Sanskrit is the nationally recognized literary-arts magazine published by students interested in the arts. Original work in writing, drawing, photography, and other arts is welcomed by the editor. Submissions are professionally juried, and selections are published in the annual edition of the magazine.

Internships are available in Student Media. Interns can earn academic credit and receive "hands on" media experience in writing, design, photography, advertising, desktop publishing, and management.

For more information about how to get involved with the student media, contact the office at 704-687-2663 or visit <http://media.uncc.edu>. Student Media is located in the Student Union.

Niners on the Weekend

Niners on the Weekend (NOW) hosts student campus programs on the weekend throughout the school year. It is our goal to provide an entertaining outlet on campus for all students. There are two events each weekend and most of them are held in the Student Union. They include game shows, video game tournaments, trips, Club 49er and more. Visit <http://now.uncc.edu> for all the latest event information and sign up for our weekly listserv.

Center for Leadership Development

<http://leadership.uncc.edu>

The UNC Charlotte Center for Leadership Development provides students with opportunities to develop leadership skills and abilities and provides the University and student organizations more effective leadership. The goal is to provide a comprehensive and diverse program of leadership development activities for current student leaders and potential leaders.

The program consists of both group and self-paced leadership components, retreats and conferences, as well as academic courses. Individual and group consultation is also available.

Contact the Center for Leadership Development for more information at 704-687-2703 or online at <http://leadership.uncc.edu>.

Multicultural Resource Center

The **Multicultural Resource Center (MRC)** offers an environment for students, faculty and staff to learn about and to further explore personal identity, diversity, and global relationships while making connections with individuals that represent a vast array of heritages, backgrounds, interests, and experiences. The Center is available to assist students individually in their own explorations of themselves and/or others as well as to assist student organizations in their operations and programming efforts.

The MRC is located in the Student Union and houses a resource area bearing information regarding both University and community support sources; a resource library containing reference books and video media (VHS/DVD) that cover a variety of topics; an assortment of multicultural publications (magazines, newspapers, & newsletters); and computers with printing access. To supplement these resources, the Center offers ongoing education and training exploring the many facets of diversity and human relations.

Programming supported by the MRC include the annual International Festival, Martin Luther King, Jr. Celebration, cultural heritage months (Black History Month, Hispanic/Latino Heritage Month, Asian/Pacific Islander Heritage Month, etc.) , as well as other special events. Along with these efforts, the MRC provides support to 40+ multicultural student organizations, as well as support for student/student organizational efforts that support its mission and purpose. Supported organizations include the Black Student Union (BSU), Latin American Student Organization (LASO), Muslim Student Association, People Recognizing Individual Diversity and Equality (PRIDE), Vietnamese Student Association, and a host of others. For more details, please visit <http://mrc.uncc.edu>.

Multicultural Student Council (MSC) is a diverse body of students organized to assist the MRC in its efforts to promote multiculturalism. Along with the Center, the MSC works closely and collaboratively with students, student organizations, and departments to support the unique diversity present at UNC Charlotte and the Charlotte community.

Religious & Spiritual Life (RSL) is a subunit of the Multicultural Resource Center and serves as a liaison for faith-related matters within the University community. Additionally, RSL assists in the holistic development of UNC Charlotte students by providing avenues to explore religious and spiritual identity and expression. Through dialogues, workshops, programming, and student organizational support, RSL promotes personal growth, mutual understanding, and a healthy, engaged community. Visit online at <http://rsl.uncc.edu/>.

Venture

Venture offers experiential learning, workshops and adventure trips in outdoor settings. Activities include day trips as well as weekend trips in a variety of outdoor endeavors from backpacking to rock climbing to kayaking, and programs at our on-campus team development course, high ropes team challenge course, and indoor climbing wall. Venture programs are modeled on Outward Bound and are designed to facilitate individual growth through physical challenge, group interaction, and personal reflection; all while having fun. Students involved in VOLTAGE (Venture Outdoor Leadership Training and Group Experience) have the opportunity to be trained as student leaders to instruct Venture's variety of programs. Venture houses a resource library to help individuals plan their own adventure trips. Outdoor camping gear can be rented.

For more information about Venture please visit <http://venture.uncc.edu>, contact the Venture Program at 704-687-2486, or stop by the Venture office in the Cone University Center (entrance off the Cone lower plaza).

Student Organizations

The University has approximately 300 student organizations that enhance the academic experience of UNC Charlotte students. Graduate students may join any existing student organization, whether it is designated as undergraduate or graduate. The categories of student organizations include: academic (pre-professional), performance, service, political, religious, multicultural, international, interest, sport clubs, honor societies, graduate groups and "other." There are many benefits to joining a student organization, including making new friends, developing new skills and abilities, working as part of a team, learning to set and achieve goals, sharing your time and talents, as well as having fun. The Office of Student Activities encourages you to enhance your education at UNC Charlotte by becoming involved. A current listing of all student organizations is available online at <http://studentorgs.uncc.edu>.



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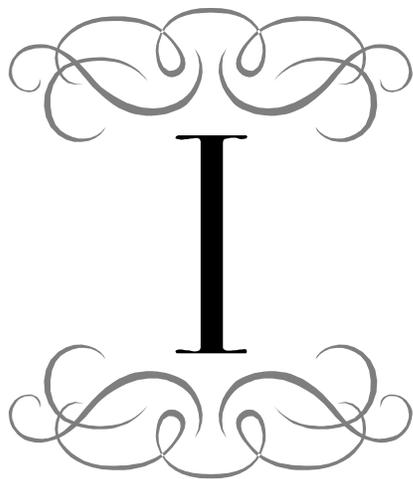
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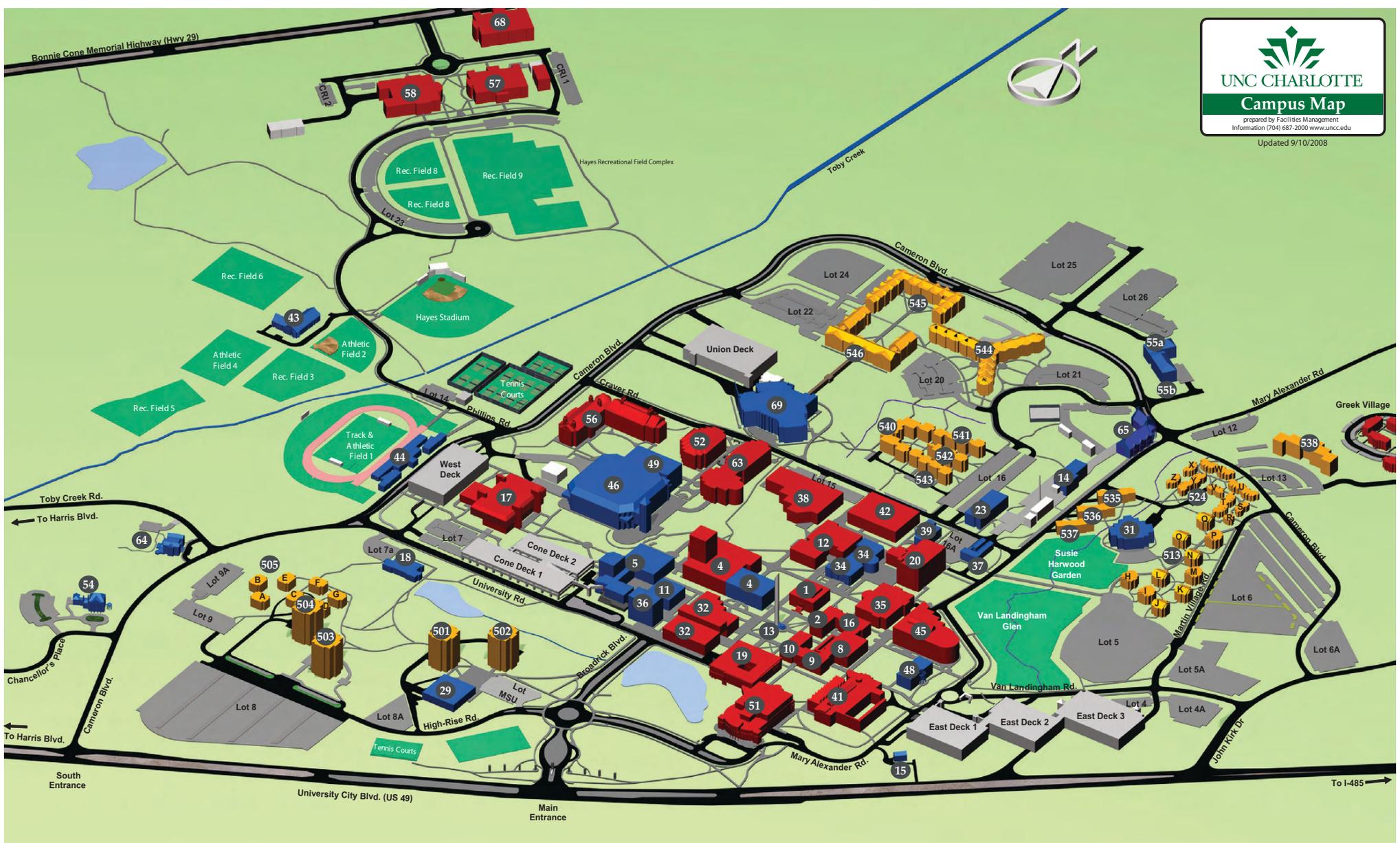
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16 Barnard	1 Kennedy
17 Belk Gym	2 Macy
68 Bioinformatics	20 McEniry
38 Burson	51 Robinson Hall
42 Cameron Hall	19 Rowe
52 College of Education	12 Smith
32 Colvard	41 Storrs
8 Denny	10 Winningham
57 Duke Centennial Hall	56 Woodward Hall
45 Fretwell	
35 Friday	
9 Garinger	
58 Grigg Hall	

Services - Places of Interest	
General	
39 Auxiliary Services Building	49 Millmore-Wallis Center
46 Barnhardt	55b Police
Student Activity Center	65 Student Health Center (new)
Haltom Arena	Administration
34 Bookstore	11 King
18 Brocker	Registrar
48 Calo Hall	14 Receiving / Stores
Admissions	36 Reese
5 Cone University Center	Student Accounts
4 Counseling Center	69 Student Union
55a Facilities Management	Dining Services
23 Facilities Operations & Parking Services	31 Cafeteria Activities Building
37 McMillan Greenhouse	34 Prospector
	29 Residence Dining Hall

Places of Interest	
15 Alumni House	64 Harris Alumni Center (new)
13 Belk Tower	54 Bissell House
54 Bissell House	Chancellor's Residence
Chancellor's Residence	44 Irwin Belk Track & Field Center
44 Irwin Belk Track & Field Center	Susie Harwood Garden
Susie Harwood Garden	Van Landingham Glen
Van Landingham Glen	43 Wachovia Field House

Campus Housing	
535 Cedar Hall	502 Sanford Hall
543 Elm Hall	503 Scott Hall
538 Hawthorn Hall	537 Sycamore Hall
536 Hickory Hall	544 Witherspoon Hall
504 Holshouser Hall	
505 Hunt Village	
545 Laurel Hall	
546 Lynch Hall	
542 Maple Hall	
513 Martin Village	
501 Moore Hall	
540 Oak Hall	
524 Phase III	
541 Pine Hall	

Parking Areas	
Resident, Commuter & F/S	
Lot 5 & 5A	
Lot 6	
Lot 8	
Lot 14	
Lot 23	
Lot 25	
Commuter & F/S	
Lot 4 & 4A	
Lot 7 & 7A	
East Deck 2	
East Deck 3	
West Deck	
Union Deck	

Resident & F/S	
Lot 8A	
Lot 9	
Lot 9A	
Lot 12	
Lot 13	
Lot 16 *	
Lot 20	
Lot 21	
Lot 22	
Lot 24	
Lot MSU	

Faculty & Staff	
Lot 11	
Lot 11A	
Lot 15	
Lot 26	
CRI 1	
CRI 2	
Cone Deck 1	
Cone Deck 2	
East Deck 1	
Union Deck	

* Note: No F/S in this lot except in marked spaces