

# Graduate Catalog | 2019-20



North Carolina Agricultural and Technical State University

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# Graduate Catalog 2019-2020

## The Graduate College



North Carolina Agricultural and Technical State University  
1601 East Market Street  
Greensboro, North Carolina 27411

[www.ncat.edu/tgc](http://www.ncat.edu/tgc)

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## Introduction

Welcome to the Graduate Catalog! The Graduate College exemplifies North Carolina A&T State University's tradition of excellence in learning, discovery and engagement. We are proud of our unique approach to the graduate enterprise that comprises the combined efforts of an intercultural faculty and staff, a diverse student population, and an unparalleled research and learning experience. Our alumni are leading thinkers and innovators in a variety of fields, seeking to improve life for all in the 21st century and beyond.

In 2016, the US News and World Report published its rankings that listed North Carolina A&T as the top ranked public HBCU in the nation and ranked several graduate programs: Rehabilitation Counseling (58), Industrial and Systems Engineering (66), Joint Master's in Social Work with UNCG (78), Electrical Engineering program (139). The US News and World Report publication ranked the online master's program in Information Technology at 28<sup>th</sup> place and the online Graduate Education programs at 153<sup>rd</sup> place.

In a special report released in 2015, Money magazine ranked A&T among North Carolina's top ten colleges. In 2016, Money and Essence magazines ranked A&T as one of the top 10 colleges for African Americans. In 2016, A&T was also included in Money magazine's Best Colleges For Your Money list.

In the 2013 ranking of national universities by Washington Monthly magazine, North Carolina A&T State University has been ranked No. 33 overall and No. 2 in the category of social mobility. Washington Monthly rates schools overall based on their contribution to the public good in three categories: social mobility – recruiting and graduating low-income students; research – producing cutting-edge scholarship and PhDs; and service – encouraging students to give something back to their country.

Our state of the art research centers and facilities include the NASA Center for Aviation Safety, the NSF Engineering Research Center for Revolutionizing Metallic Biomaterials, the NOAA-Interdisciplinary Scientific Environmental Technology Center, the Center for Post-Harvest Technologies, the Interdisciplinary Center for Entrepreneurship and E-Business and the recently established Joint School for Nanoscience and Nanoengineering.

The Graduate College at North Carolina A&T State University offers 9 doctoral degree programs (12 concentrations), 29 master's degree programs (53 concentrations), one post-master's certificate program, and 8 post-baccalaureate certificate programs in collaboration with the following colleges: College of Agriculture and Environmental Sciences, College of Arts Humanities and Social Sciences, College of Business and Economics, College of Education, College of Engineering, College of Health and Human Sciences, College of Science and Technology, and the Joint School of Nanoscience and Nanoengineering. Currently, six graduate programs including one doctoral program, five master's programs and one post-baccalaureate certificate program have been approved for distance education. Details regarding all our programs of study are provided in this catalog. NC A&T also offers a variety of financial assistance options for graduate study.

We invite you to explore the catalog as well as our website for more information on our academic programs, research opportunities, admission processes, and financial assistance. Please don't hesitate to call us at 336-285-2366 or email us at [grad@ncat.edu](mailto:grad@ncat.edu) if you have any questions.

Best wishes.

Clay Gloster, Jr, PhD  
Interim Dean, The Graduate College

## **Academic Calendar**

The University Calendar is subject to periodic revision. The updated academic calendars are available at <http://www.ncat.edu/registrar-office/academic-calendar/index.html>.

## **Catalog Policies and Disclaimers**

The *North Carolina Agricultural and Technical University Graduate Catalog* contains academic policies and regulations that relate to graduate courses, graduate degree programs and graduate certificate programs. The Graduate College staff will be responsible for interpreting policies and regulations stated in the Catalog as needed.

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 tuition and fees.

The requirements specified in this *Catalog* apply to students who commence their studies at North Carolina A&T State University during the 2017-2018 academic year and who remain in continuous enrollment at the institution until they graduate. If requirements are changed, students may elect to comply with the new requirements or to remain under the requirements by which they are governed at the time of the change. A student who elects to comply with the requirements of a newer catalog must do so by declaring such intent in writing at least one semester prior to graduation. This declaration must be approved by the academic department and the Graduate College.

Students who change their program of study are bound by the requirements of their new program of study that are in effect the semester they officially begin studies in the new program. Furthermore, students who are readmitted to the University are bound by the program and degree requirements in force at the time of readmission.

## **Student's Responsibility**

Each student is responsible for the timely completion of his or her academic program, for familiarity with the *Catalog*, for maintaining good academic standing, and for meeting all other degree requirements. Students are expected to assume academic and financial responsibility for the courses in which they enroll. While the student's advisor should be consulted regularly, the final responsibility remains that of the student.

A student is also required to have knowledge of and observe all regulations pertaining to campus life and student behavior. Each student is expected to participate in campus and community life in a manner that will reflect credibly upon the student and the University. All students are expected to abide by the Student Handbook.

Email is the official form of communication at the University; students are responsible for checking their ncat.edu email regularly. Students are expected to also maintain their contact information including mailing address and telephone number with the Office of the Registrar.

## **The University of North Carolina**

The University of North Carolina is a multi-campus state university that encompasses 16 such institutions, as well as the NC School of Science and Mathematics, the nation's first public residential high school for gifted students. Chartered by the North Carolina General Assembly in 1789, the University of North Carolina was the first public university in the United States to open its doors 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. Additional institutions of higher education, diverse in origin and purpose, began to win sponsorship from the General Assembly beginning as early as 1877. Five were historically black institutions, and another was founded to educate American Indians. Some began as high schools. Several were created to prepare teachers for the public schools. Others had a technological emphasis. One is a training school for performing artists.

The 1931 session of the 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 Women'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 legislation was passed 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 (now the University of North Carolina School of the Arts), Pembroke State University (now the University of North Carolina at Pembroke), Western Carolina University, and Winston-Salem State University. In 1985 the NC School of Science and Mathematics was declared an affiliated school of the University; in July 2007 NCSSM by legislative action became a constituent institution of the University of North Carolina. All the schools and universities welcome students of both sexes and all races.

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 for 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 UNC campuses 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 university 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 body, who serves *ex officio*. (The UNC School of the Arts has two additional *ex officio* members; and the NC School of Science and Mathematics has a 27-member board as required by law.) Each Board of Trustees holds extensive powers over academic and other operations of its campus on delegation from the Board of Governors.

In addition to its teaching role, the University of North Carolina has a long-standing commitment to public service. The UNC Center for Public Television, the UNC Health Care System, the cooperative extension and research services, nine area health education centers, and myriad other University programs and facilities reap social and economic benefits for the state and its people.

### ***Mission***

The mission of the University is shaped in large measure by the constitutional and statutory mandates by which public higher education is established and maintained. Article IX of the Constitution of the State declares:

Sec. 8. Higher education. The General Assembly shall maintain a public system of higher education, comprising The University of North Carolina and such other institutions of higher education as the General Assembly may deem wise.

Sec. 9. Benefits of public institutions of higher education. The General Assembly shall provide that the benefits of The University of North Carolina and other public institutions of higher education, as far as practicable, be extended to the people of the State free of expense.

This constitutional mandate for a public system of higher education is effected by Chapters 115 and 116 of the General Statutes. Chapter 115A, enacted in 1963, provides for a statewide network of community and technical colleges and institutes which offer two-year college transfer and technical and vocational programs. Chapter 116 of the statutes, as amended by the General Assembly effective July 1, 1972, provides in Section 3 that:

The board of trustees of the University of North Carolina is hereby redesignated, effective July 1, 1972, as the 'Board of Governors of the University of North Carolina.' The Board of Governors shall be known and distinguished by the name of 'the University of North Carolina' and shall continue as a body politic and corporate and by that name shall have perpetual succession and a common seal.

Section 4 of the statute provides for the University of North Carolina to be composed of the 16 public senior institutions in the state.

The Higher Education Reorganization Act of 1971, which placed those 16 institutions under one governing board, asserted the basic objectives and purposes for the University of North Carolina: to foster the development of a well-planned and coordinated system of higher education, to improve the quality of education, to extend its benefits, and to encourage an economical use of the state's resources.

Central to the process of strategic planning is the clarification of the overall mission of the University as a whole and the role and scope of the constituent institutions within that overall mission. As a part of the comprehensive mission review of 1992, the Board of Governors adopted a general mission statement for the University. This statement, with minor modifications, was given statutory status in 1995 when the General Assembly amended Chapter 116-1 of the General Statutes to include the following as the official mission statement of the University of North Carolina:

The University of North Carolina is a public, multi-campus university dedicated to the service of North Carolina and its people. It encompasses the 16 diverse constituent institutions and other educational, research, and public service organizations. Each shares in the overall mission of the University. That mission is to discover, create, transmit, and apply knowledge to address the needs of individuals and society. This mission is accomplished through instruction, which communicates the knowledge and values and imparts the skills necessary for individuals to lead responsible, productive, and personally satisfying lives; through research, scholarship, and creative activities, which advance knowledge and enhance the educational process; and through public service, which contributes to the solution of societal problems and enriches the quality of life in the State. In the fulfillment of this mission, the University shall seek an efficient use of available resources to ensure the highest quality in its service to the citizens of the State.

Teaching and learning constitute the primary service that the University renders to society. Teaching, or instruction, is the primary responsibility of each of the constituent institutions. The relative importance of research and public service, which enhance teaching and learning, varies among the constituent institutions, depending on their overall missions.

### ***Board of Governors***

Allison, Darrell	Long, Steven B.
Bissette Jr., W. Louis	Maxwell, Ann
Blue, Kellie Hunt	Mitchell, J. Alex
Burris-Floyd, Pearl	Murphy, Wendy F.
Byers, C. Philip	Nelson, Anna S.
Coward, Carolyn	Parrish, R. Doyle
Daughtry, N. Leo	Powers, David M.
Davenport, Walter C.	Ramsey, Randall “Randy”
Fetzer, Thomas H.	Rucho, Robert A.
Goolsby, Thom	Sloan III, O. Temple
Grainger, H. Frank	Smith Jr., Harry L.
Hardin, Tyler	Webb, William
Holmes Jr., James L.	Wiley, Laura I.
Knott, Joe	Williford, Michael
Kotis III, W. Marty	

### ***General Administration***

William L. Roper, *Interim President*  
Junius J. Gonzales, *Senior Vice President for Academic Affairs*  
Kevin Howell, *Senior Vice President for External Affairs*  
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### **North Carolina A&T State University**

North Carolina Agricultural and Technical State University is a learner-centered community that develops and preserves intellectual capital through interdisciplinary research, discovery, engagement and operational excellence. The university’s rich history dates back over 118 years. N.C. A&T was established as the A. and M. College for the “Colored Race” by an act of the General Assembly of North Carolina ratified March 9, 1891. It was in the fall of 1890, when the North Carolina General Assembly enacted a second Morrill Act that mandated a separate college for the colored race. (The College operated in Raleigh as an annex to Shaw University during the years 1890-1891, 1891-1892, and 1892-1893). A group of Greensboro citizens banded together to make a permanent home for the institution. Members such as Dr. DeWitt, a black dentist, C. Benbow and Charles H. Moore donated 14 acres of land for the site and an additional \$11,000 in cash that aided in construction of the buildings. This amount was supplemented by an appropriation of \$2,500 from the General Assembly. The plan was approved on March 9, 1891, and the first building was completed in 1893: the Agricultural and Mechanical College for the Colored Race (now North Carolina A&T State University) had found its new home.

In 1915 state legislators changed the college's name to The Agricultural and Technical College of North Carolina, and in 1967 elevated it to university status. N.C. A&T became a constituent university of The University of North Carolina in 1972.

Since its inception, A&T has maintained a tradition of excellence in education. Under the leadership of Dr. Harold L. Martin Sr., the university's current Chancellor, A&T continues to thrive as it sustains its rich legacy.

North Carolina Agricultural and Technical State University is a public, land-grant, doctoral research institution located in Greensboro, NC. The university is a member of the University of North Carolina system.

The university offers 117 undergraduate programs, 29 master's programs, and 9 doctoral programs. The academic programs are offered through the College of Agriculture and Environmental Sciences; College of Arts Humanities and Social Sciences; College of Business and Economics; College of Education; College of Health and Human Sciences; College of Science and Technology; College of Engineering; Joint School of Nanoscience and Nanoengineering; and the Graduate College.

A&T's outstanding student body is the primary strength of the university. Students are carefully selected from thousands of applicants annually. Once enrolled, they are taught and mentored by excellent faculty, the majority of whom have earned doctoral and other degrees from some of the nation's most prestigious graduate and professional schools.

A&T graduates the largest number of African-American engineers at the undergraduate, masters, and doctoral levels and psychology undergraduates in the nation. Through its nationally accredited AACSB College of Business and Economics, the institution is among the largest producers of African American certified public accountants. True to its heritage, North Carolina A&T is home to the largest agricultural school among HBCUs and the second largest producer of minority agricultural graduates. The institution was recently awarded a prestigious National Science Foundation's Engineering Research Center (ERC) grant for biomedical engineering and nanobio applications research.

The University has advanced to the forefront in the area of research, generating over \$60 million in research grants and contracts and more than \$6 million in appropriations for agricultural research and cooperative extension. It also generates contracts with major international companies, foundations, and federal agencies to secure funding to enhance academic programs and to provide student scholarships.

A&T is proud of its 40,000 alumni of record who occupy leadership positions across the country and around the world. These alumni spread the Aggie tradition throughout the nation, continuing to strive for excellence and to make their mark in society. Among its well-known successful alumni are the Rev. Jesse Jackson Sr., civil rights activist; U.S. Congressman Edolphus Towns (D-NY); retired Maj. Gen. Charles D. Bussey; retired Brig. Gen. Clara Adams-Ender; Ralph Shelton, founder of Southeast Fuels; Dr. Joe Dudley, Sr., founder of Dudley Products, Inc.; Alvin Attles, vice president of Golden State Warriors; former District Court Judge Lawrence McSwain; U.S. Congressman Jesse Jackson Jr. (D-ILL); former North Carolina Supreme Court Chief Justice Henry E. Frye; The Greensboro/A&T Four, Jibreel Khazan, Joseph McNeil, Franklin McCain and the late David Richmond; North Carolina legislator Alma Adams; Elvin Bethea, 2003 Pro Football Hall of Famer; Janice Bryant-Howroyd, founder and CEO of ACT 1 Group; Willie Deese, president, Merck Manufacturing Division; Donna Scott James, managing director, Lardon Associates LLC; Dmitri Stockton, president and CEO of GE Consumer Finance for Central and Eastern Europe; and the late astronaut Dr. Ronald E. McNair.

Twelve presidents/chancellors have served the university since its founding: Dr. John O. Crosby (1892-1896), Dr. James B. Dudley (1896-1925), Dr. Ferdinand D. Bluford (1925-1955), Dr. Warmoth T. Gibbs

(1956-1960), Dr. Samuel DeWitt Proctor (1960-1964), Dr. Lewis C. Dowdy (1964-1980), Dr. Cleon Thompson Jr. (1980-1981, interim), Dr. Edward B. Fort (1981-1999), Dr. James C. Renick (1999- 2006), Dr. Lloyd V. Hackley (2006-2007, interim), Dr. Stanley Battle (2007- 2009) and Dr. Harold L. Martin Sr. (2009 – Present).

### ***Mission***

North Carolina Agricultural and Technical State University advances knowledge through scholarly exchange and transforms society with exceptional teaching, learning, discovery, and community engagement. An 1890 land-grant doctoral research institution with a distinction in STEM and commitment to excellence in all disciplines, North Carolina A&T creates innovative solutions that address the challenges and economic needs of North Carolina, the nation and the world.

### ***Board of Trustees***

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### ***Nondiscrimination Policy***

North Carolina Agricultural and Technical State University does not discriminate against employees, students, or applicants on the basis of age, color, disability, gender, gender identity, gender expression, national origin, political affiliation, race, religion, sexual orientation, genetic information, veteran status,



or any other basis protected by law. For inquiries regarding non-discrimination policies, contact the Title IX Coordinator at [titleixcoordinator@ncat.edu](mailto:titleixcoordinator@ncat.edu)

North Carolina Agricultural and Technical State University supports the protections available to members of its community under all applicable Federal and state laws, including Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Sections 799A and 845 of the Public Health Service Act, the Equal Pay and Age Discrimination Acts, the Rehabilitation Act of 1973, and Executive Order 11246.

## **The Graduate College**

Graduate education at North Carolina Agricultural and Technical State University was authorized by the North Carolina State Legislature in 1939. The authorization provided for training in agriculture, technology, applied sciences, and other approved areas of study. An extension of the graduate program approved by the General Assembly of North Carolina in 1957 provided for enlargement of the curriculum to include teacher education, as well as such other programs of a professional or occupational nature as might be approved by the North Carolina Board of Higher Education.

On July 1, 1967, the Legislature of North Carolina approved regional university status for the institution and renamed it North Carolina Agricultural and Technical State University. The University awarded its first master's degree in 1941 to Woodland Ellroy Hall. Since that time, over 8,000 students have received advanced graduate degrees from the University. A significant number of master's graduates have gone on to earn doctoral degrees in their chosen disciplines, either at North Carolina A&T or at other universities.

The Graduate College coordinates and administers advanced programs and course offerings leading to 9 doctoral, 29 master's and 9 certificate programs in collaboration with the College of Agriculture and Environmental Sciences; College of Arts Humanities and Social Sciences; College of Business and Economics; College of Education; College of Health and Human Sciences; College of Science and Technology; College of Engineering; and the Joint School of Nanoscience and Nanoengineering. Degrees offered include PhD, MA, MAEd, MAT, MBA, MS, MSA, and MSW. The Graduate Catalog provides detailed information about our programs, some of which are available online. NCA&T also offers a variety of financial assistance options for graduate study.

The Graduate College has an integrated and intercultural faculty and student body and beckons students from all over the world. The Graduate College provides a foundation of knowledge and techniques for those who wish to enhance their career options or to continue their education in doctoral programs. While studying at this university, it is expected that graduate students will (i) acquire special competence in their chosen fields; (2) further develop their ability to think independently and constructively; (3) develop and demonstrate the ability to collect, organize, evaluate, create, and report facts that will enable them to make a scholarly contribution to knowledge about their discipline; and (4) apply new and existing knowledge so as to contribute to their professions and to humankind.

In 1994, the first doctoral programs were authorized at North Carolina A&T State University in the Electrical Engineering and Mechanical Engineering disciplines. The first set of doctoral students enrolled the same year. The University granted its first Ph.D degrees to Sidney Llewellyn Bryson (Electrical Engineering), Alfred L. Burress (Electrical Engineering) and Christopher Grace (Mechanical Engineering) in 1999. The PhD in Industrial and Systems Engineering was added in 2000. In 2001, Electrical Engineering student Yaxi Shen became the first female to receive the PhD degree. In 2003, Tracie Jamison (Electrical Engineering) and Mary Murdock (Mechanical Engineering) became the first African American females as well as the first Title III HBGI Fellows to receive doctoral degrees. In 2005, two interdisciplinary PhD programs in Energy and Environment Systems and in Leadership Studies were added. The PhD in Computational Science and Engineering was established in 2010. The UNC Board of

Governors approved the establishment of the PhD in Nanoengineering in 2011. The PhD in Rehabilitation Counseling was established in 2013. A year later, the PhD in Computer Science was approved in 2014. Currently, over 375 doctoral students are enrolled at the university; over 60% are in STEM disciplines. Since the establishment of its first doctoral programs, the university has awarded over 300 doctoral degrees.

In 2004, based on its production of doctoral degrees and research, North Carolina A&T qualified for Doctoral Research University status established by the Carnegie Foundation. This status was formally approved by The University of North Carolina Board of Governors.

Fifteen persons have served as dean of the Graduate School since its beginning in 1939. They are Dr. Wadaran L. Kennedy (1939-1951), Dr. Frederick A. Williams (1951-1961), Dr. George C. Royal (1961-1965), Mr. J. Niel Armstrong (1965-1966), Dr. Darwin Turner (1966-1969), Dr. Albert W. Spruill, (1970-1993), Dr. Meada Gibbs (1993-1996), Dr. Charles Williams (1996-1997), Dr. Melvin N. Johnson (1997), Dr. Thoyd Melton (1998-2000), Dr. Kenneth H. Murray (2000-2006), Dr. Thomas Hassell (2006-2006), Dr. William J. Craft (2007 -2009), Dr. Kenneth Murray (2009-2009), Dr. Alan Letton (2010 - 2011), Dr. Sanjiv Sarin (2011-present).

### **Graduate Council**

The Graduate Council is responsible for formulating all academic policies and regulations affecting graduate students, graduate courses, and graduate curricula. The council consists of faculty, students and administrative representatives from graduate programs. The Dean of the Graduate College serves as chairperson of the Council.

### **Accreditation and Institutional Memberships**

North Carolina Agricultural and Technical State University 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 North Carolina Agricultural and Technical State University.

#### *Programs and their accrediting agencies:*

- American Chemical Society Certification Program – American Chemical Society
- Business and Accounting programs – AACSB International – Association to Advance Collegiate Schools of Business
- Child Development, Early Education and Family Studies – National Council for Accreditation of Teacher Education
- Computer Science – Computing Accreditation Commission, Accreditation Board for Engineering and Technology
- Construction Management – American Council for Construction Education, and National Association of Industrial Technology
- Didactic Program in Dietetics – Commission on Accreditation for Dietetics Education, American Dietetic Association
- Engineering: Architectural, Biological, Chemical, Civil, Electrical, Industrial and Systems, and Mechanical Engineering programs – Engineering Accreditation Commission, Accreditation Board for Engineering and Technology
- Family and Consumer Sciences – American Association of Family and Consumer Sciences
- Human Development and Services – Council on Accreditation for Counseling and Related Educational Programs, and Council on Rehabilitation Education
- Industrial Technology – National Association of Industrial Technology

- Journalism and Mass Communication – Accrediting Council on Education in Journalism and Mass Communication
- Landscape Architecture – American Society of Landscape Architects
- Media Program – Association of Educational Communications and Technology
- Music – National Association of Schools of Music
- School of Nursing – National League for Nursing Accrediting Commission
- Social Work – Council on Social Work Education
- Teacher education programs – National Council for Accreditation of Teacher Education, and North Carolina State Department of Public Instruction
- Theater Arts Program in Acting – National Association of Schools of Theater

*University membership in Professional organizations:*

- Accreditation Board for Engineering and Technology
- Accrediting Council on Education in Journalism and Mass Communication
- American Association of Colleges of Nursing
- American Association of Colleges for Teacher Education
- American Association of Collegiate Registrars and Admission Officers
- American Association of Family and Consumer Sciences
- American Association of University Women (graduates are eligible for membership)
- American Chemical Society
- American College Public Relations Association
- American Council for Construction Education
- American Council on Education
- American Library Association
- American Personnel and Guidance Association
- American Public Welfare Association
- American Society for Engineering Education
- American Society of Landscape Architects
- American Society of Mechanical Engineers
- Association of Educational Communications and Technology
- Associated Schools of Construction
- Association to Advance Collegiate Schools of Business International
- Association of American Colleges
- Association of College Unions International
- Association of Collegiate Deans and Registrars
- Association of Collegiate Schools of Architecture
- Association of Public Land Grant Universities Board on Human Sciences
- College Language Association
- Conference of Southern Graduate Schools
- Council on Accreditation for Counseling and Related Educational Programs
- Council of Graduate Schools
- Council of Historically Black Graduate Schools
- Council on International Education Exchange
- Council on Rehabilitation Education
- Council on Social Work Education
- National Association of Business Teacher Education
- National Association of College and University Business Officers
- National Association of College and University Food Service

- National Association of Industrial Technology, International Association of Technology Education
- National Association of Schools of Music
- National Association of Schools of Theatre
- National Association of State Universities and Land Grant Colleges
- National Association of Student Personnel Administrators
- National Commission on Accrediting
- National Consortium for Graduate Degrees for Minorities in Engineering and Science
- National Council for Accreditation of Teacher Education
- National Institutional Teacher Placement Association
- National League for Nursing
- North Carolina Association of Colleges and Universities
- North Carolina League of Nursing
- North Carolina Library Association
- North Carolina State Department of Public Instruction
- Southeastern Library Association
- Southern Association of Schools and Colleges, Commission on Colleges
- Southern Regional Education Board Council on Collegiate Education for Nursing
- Southern Universities Research Association
- University of North Carolina Exchange Program
- University of North Carolina Graduate Council

### **Degree and Certificate Programs Offered**

The Graduate College at North Carolina A&T State University offers 9 doctoral degree programs (12 concentrations), 29 master's degree programs (53 concentrations), one post-master's certificate program, and 8 post-baccalaureate certificate programs in collaboration with the following schools and colleges: College of Agriculture and Environmental Sciences, College of Arts Humanities and Social Sciences, College of Business and Economics, College of Education, College of Engineering, College of Health and Human Sciences, College of Science and Technology, and the Joint School of Nanoscience and Nanoengineering. Currently, six graduate programs including one doctoral program, five master's programs and one post-baccalaureate certificate program are available through distance education.

In 2016, the US News and World Report published its rankings that included the following A&T programs: Rehabilitation Counseling was ranked 58<sup>th</sup>, Industrial and Systems Engineering was ranked 66<sup>th</sup>; the master's in Social Work (joint with UNCG) was ranked 78<sup>th</sup>; the Electrical Engineering program was ranked 139<sup>th</sup>. The US News and World Report publication ranked the online master's program in Information Technology at 28<sup>th</sup> place and the online Graduate Education programs at 153<sup>rd</sup> place. Furthermore, N.C. A&T is ranked #16 out of 26 programs in the Best Online Graduate Computer Information Technology Programs for Veterans, and #112 out of 156 Best Online Graduate Education Programs for Veterans.

A complete list of programs offered is given below.

#### **Doctoral Degrees**

- Ph.D. Computational Science and Engineering
- Ph.D. Computer Science
- Ph.D. Electrical Engineering
- Ph.D. Energy and Environmental Systems with concentrations in:
  - Atmospheric Sciences
  - Sustainable Bio Products

- Energy and Environmental Sciences and Economics
- Energy and Environmental Systems
- Ph.D. Industrial and Systems Engineering
- Ph.D. Leadership Studies \*
- Ph.D. Mechanical Engineering
- Ph.D. Nanoengineering
- Ph.D. Rehabilitation Counseling and Rehabilitation Counselor Education

### **Masters Degrees**

- MA English and African American Literature
- MAEd Elementary Education
- MAEd Reading Education
- MAT Master of Arts in Teaching\* with concentrations in:
  - Biology Education
  - Business Education
  - Chemistry Education
  - Child Development: Early Education & Family Studies Birth-K
  - Elementary Education
  - English Education
  - Family and Consumer Sciences Education
  - History Education
  - Math Education
  - Physical Education
  - Special Education
  - Technology Education
- MBA Business Administration with concentrations in:
  - Accounting
  - Human Resource Management
  - Supply Chain Systems
- MS Adult Education
- MS Agricultural Education\* with concentrations in:
  - Professional Licensure
  - Professional Service
- MS Agricultural and Environmental Systems with concentrations in:
  - Integrated Animal Health Systems
  - Agribusiness & Food Industry Management
  - Natural Resources and Environmental Systems
- MS Applied Mathematics
- MS Bioengineering
- MS Biology with concentrations in:
  - Biology
  - Industrial Biosciences (PSM)
- MS Chemical Engineering
- MS Chemistry with concentrations in:
  - Chemistry
  - Developmental and Applied Chemistry (PSM)
- MS Civil Engineering with concentrations in:
  - Civil Engineering
  - Systems Engineering

- MS Computational Science and Engineering with concentrations in:
  - Computational Science and Engineering
  - Systems Engineering
- MS Computer Science
- MS Electrical Engineering
- MS Food and Nutritional Science
- MS Industrial and Systems Engineering with concentrations in:
  - Industrial and Systems Engineering
  - Systems Engineering
- MS Information Technology \*
- MS Instructional Technology \*
- MS Mechanical Engineering with concentrations in:
  - Mechanical Engineering
  - Systems Engineering
- MS Mental Health Counseling with concentrations in:
  - Mental Health Counseling - Clinical
  - Mental Health Counseling - Rehabilitation
- MS Nanoengineering
- MS Physics
- MS School Counseling
- MS Technology Management\* with concentrations in:
  - Technology Management
  - Construction Science and Management
- MSA School Administration
- MSW Social Work (Joint with UNCG)

### **Post Baccalaureate Certificate Programs**

- Community College Teaching
- Family and Consumer Sciences\*
- Supply Chain Management
- Advanced Waste Management
- Marriage and Family Counseling
- Rehabilitation Counseling and Behavioral Addiction
- Rehabilitation Psychology and Behavioral Medicine
- Vocational Evaluation and Work Adjustment

### **Post Masters Certificate Programs**

- School Administration

\* Approved for distance education

### **Distance Education**

The Instructional Technology and Distance Education (ITSDE) office supports the use of educational technologies to enhance the teaching, learning, and research experiences of the faculty, students, and staff at the University. The ITSDE office provides support and infrastructure services to assist faculty with the development and continued maintenance of fully online, hybrid, and traditional face-to-face courses. The overall goal of the office is to enhance faculty-student interactions, increase student engagement with course materials, foster communication and collaboration, and increase opportunities for students to develop their skills for the workforce and lifelong learning.

The following units report to this office: Learning Management Systems, Instructional Design Services, Classroom Technology Services, Technology Training, Multimedia Support, and Program and Student Support for Distance Education.

ITSDE works in close cooperation with the academic colleges to administer online courses, certificates, and degree programs to students seeking convenient and cost-efficient opportunities to complete their education. All online courses at the University are delivered through an online Learning Management System (LMS) that allows the University to deliver quality instruction in a web-based format that mirrors instruction offered in traditional face-to-face settings. Students and faculty interact via online group discussion sessions, interactive video classrooms, streamed videos, and web conferencing sessions. Students are required to log into the LMS using a secured username and password to gain access to course materials, assignments, and other important items related to their classes.

Effective Fall 2016, the University offers 15 Distance Education (DE) programs including eight (8) undergraduate degree programs (offering 13 concentrations), five (5) master's degree programs (offering 10 concentrations), and three certificate programs as listed below.

*Undergraduate degree programs:*

- i. BS, Agricultural Education
  - o Professional Service
  - o Secondary Education
- ii. BS, Business Education
  - o Business Teacher Education
  - o Information Technology
- iii. BS, Electronics Technology
- iv. BS, Environmental Health and Safety
- v. BS, Geomatics
- vi. BS, Information Technology
- vii. BA, Liberal Studies
  - o Individualized Studies
  - o African American Studies
  - o Cultural Change
  - o Women's Studies
- viii. BSN, Nursing (RN-BSN Completion Option)

*Graduate degree programs:*

- i. MS, Agricultural Education
  - o Prof Licensure
  - o Prof Service
- ii. MS, Information Technology
- iii. MS, Instructional Technology
- iv. MS, Technology Management
  - o Construction Science and Management
- v. MAT Teaching
  - o Business Education
  - o Elementary Education
  - o Family and Consumer Sciences Education
  - o Technology Education

*Certificate programs:*

- i. Environmental Health and Safety (undergraduate)
- ii. Family and Consumer Science (post baccalaureate)
- iii. Family Financial Planning (undergraduate)

### **Summer School**

The Office of Summer Sessions is committed to providing exemplary services to fulfill the educational and professional development needs of a diverse community of learners. The Office of Summer Sessions additionally provides a unique opportunity for the University to expand its capacity to offer courses for traditional and non-traditional students by offering educational opportunities during the summer in compact sessions.

Summer Sessions helps bridge the academic year by creating a continuous flow of learning opportunities for the university and the community-at-large while serving as a catalyst for the advancement and enhancement of lifelong learning. Consequently, students may optimize their efforts to remain on schedule for projected degree completion thus promoting higher graduation rates.

The Office of Summer Sessions features several convenient sessions of varying lengths: two five-week sessions; one two-week intersession; and one 10-week dual session. Students may enroll in a maximum of seven credit hours in each five-week session and the dual session, and one three-credit hour course during the intersession. These sessions facilitate study aimed at meeting a wide range of educational, career, and personal enrichment goals. Sessions are specifically designed for community-wide accommodation through courses, study abroad experiences, internships, and other programs that promote diversity among populations.

### **Continuing Education**

The Office of Continuing Education and Professional Development (OCEPD) offers certificate programs, courses, workshops and seminars for the working adult. The purpose of OCEPD is to extend the resources of the university to the community in accessible formats, and to assist the professional community stay abreast of cutting edge knowledge and practice. In collaboration with the academic departments, schools and colleges of the university, OCEPD offers professional development programming through industry partnerships, high tech training seminars, short courses, workshops, conferences, camps and pre-college activities for youth that supports learning, discovery and engagement.

The Office of Continuing Education and Professional Development sponsors both non-credit and contract credit programming. Continuing Education Units (CEU) may be awarded for successful completion of non-credit activities. OCEPD maintains permanent transcripts of all CEU earned.



## **Expenses and Financial Assistance**

North Carolina A&T State University is a publicly supported institution. Tuition and other required student fees meet only a part of the total cost of education of students enrolled. For each full-time student enrolled in an institution of the University of North Carolina, the State of North Carolina appropriates significant amount of public funds.

### **Tuition and Fees**

Tuition rates are based on whether or not the student is a resident of North Carolina. Tuition rates for non-residents are significantly higher than that for a resident. Tuition and fees for Distance Education students are billed separately. Furthermore, student enrolling in courses in summer courses are billed at the Summer School rates.

Tuition and fees are subject to change without prior notice. For an updated listing of tuition and fees, see the University Treasurer's website at <http://www.ncat.edu/divisions/business-and-finance/comptroller/treasurer/tuition-and-fees/index.html>.

North Carolina A&T State University provides billing statements electronically through its Online Payments system. Students and Authorized Users will receive an email notification each time that a new billing statement is available. Payments must be submitted by the scheduled due date to avoid cancellation of classes.

### **Auditing Courses**

A part-time student must pay all fees, including tuition, which would be charged to a student taking the course for credit. A full-time student is not required to pay additional fees for auditing. A change from credit registration to audit will not be permitted after late registration ends. An auditor is not required to participate in class discussions, prepare assignments, or take examinations.

### **Indebtedness to the University**

A student may not be permitted to attend classes or final examinations after the due date of any unpaid obligation. If special financial arrangements have been made, failure to comply with these arrangements as stipulated will result in the student forfeiting his/her privilege to receive special financial arrangements for deferments in the future.

Students are required to pay for any loss or damage to University property cost due to abuse, negligence, or malicious action at replacement, in addition to being subject to disciplinary action for such loss or damage.

Diplomas and transcripts are withheld until the student has paid in full all fees and charges due to the University.

### **Refunds**

A student is entitled to a refund when the account is overpaid and a credit balance is created. A student must officially withdraw from courses and, as appropriate, withdraw from the University by the posted deadline to avoid academic or financial responsibility. A student who withdraws from the University may be entitled to a partial refund of tuition and fees based on date of withdrawal; the refund schedule is available from the Treasurer's office.

Students who are awarded Federal Financial Aid and choose to withdraw will also be subject to the "Return of Title IV Funds Policy". In such cases, the Financial Aid office recalculates eligibility of Title

IV funds. This may result in an unpaid balance due to the university. For details, students are referred to the Financial Aid office.

### **Veterans**

Meeting the needs of students who receive educational benefits from the U.S. Department of Veteran Affairs is a high priority for the Office of Veteran and Disability Support Services at North Carolina A&T State University. Our Veteran Support Services office is committed to providing services and educational benefit programs for all eligible enrolled U.S. Veterans, National Guardsmen, Reservist and their eligible dependents. Students receiving veterans benefits are advised to consult the Veteran Support Services office or visit their website at <http://www.ncat.edu/student-affairs/student-services/ovdss/veteran/veterans-support.html>.

### **Full time Faculty and Employees**

All permanent employees who are regularly scheduled to work at least 30 hours each week, and have met their probationary period, are eligible to participate in the Tuition Waiver Program (TWP). The purpose of the TWP is to provide an opportunity for eligible employees to take a course and have the tuition and fees waived at North Carolina A&T State University or any of the other 15 constituent institutions of the University of North Carolina. Participation is voluntary. Tuition waiver is allowed for an academic year of fall semester, spring semester, and the summer sessions that follow, or courses taken as distance education. During the period from the fall semester through the second session of summer school, no more than two (2) waivers or two (2) classes may be approved. The Treasurer's Office should be consulted for more information.

### **Residence Status for Tuition Purposes**

The basis for determining tuition charge is whether a student is a resident or a non-resident for tuition purposes. Initial classification as either a resident or non-resident for tuition purpose is based on information provided on the application for admission. If a student chooses to petition a reclassification of his or her residence status for tuition purposes they must complete and submit the Residence and Tuition Status Application along with all required supporting documentation to the Office of Undergraduate Admissions no later than 10th day of the term for which they wish to be considered.

Residency decisions are based on North Carolina statutes (G.S. 116-143.1). The residency classification officer reviews each application on an individual basis using the guidelines provided within these statutes. Additional information regarding residency may be found in the North Carolina State Residence Classification Manual available at [http://www.northcarolina.edu/legal/residence/committee/manual/Residence\\_Manual\\_Aug\\_2010.pdf](http://www.northcarolina.edu/legal/residence/committee/manual/Residence_Manual_Aug_2010.pdf).

### **FAFSA Application**

Students may apply for need-based and some non-need-based financial aid by completing the Free Application for Federal Student Aid (FAFSA). Students should complete this form immediately after January 1. There is no processing fee and all graduate students are encouraged to complete the application. Students can submit the FAFSA on the Web (<http://www.fafsa.ed.gov>) or mail the form to the Federal Processing Center. North Carolina A&T State University school code is **002905**. The University's priority deadline for receipt of the FAFSA is **March 15th**; however, students who miss the deadline are still encouraged to complete and mail the FAFSA as soon as possible.

A financial aid award will not be offered until a student is admitted to the University. Therefore, it is important that the admission procedure be completed as soon as possible. A student enrolled as a "Post-baccalaureate Studies (PBS)" student is not eligible to receive Federal and State financial aid unless

enrolled in a Teacher Certification Program. All students must re-apply for financial assistance each academic year and separately for summer school.

### **Federal Work Study**

The Federal Work-Study program provides students with an opportunity to work part-time to assist with educational costs. The program consists of jobs on and off campus for community service opportunities. Eligible students must be enrolled at least part-time, eligible to receive federal aid and have demonstrated financial need as determined by the FAFSA application. For more information, students are referred to the Financial Aid office and to their website at <http://www.ncat.edu/admissions/financial-aid/aid/fed-wk-study-prog.html>.

### **Loans**

The Financial Aid Office administers loan programs and disburses the funds through the Federal Direct Loan Program to Graduate Students. The Financial Aid Office will determine if you are eligible for this loan based on information reported on the FAFSA.

Students are notified of the amount of aid received through the award notification. The award notification indicates the gross amount of the loan for the fall and spring semester and/or summer sessions. The student's account and bill indicate the actual amount received. For more information on the terms and conditions of federal loan programs, students are advised to consult the Financial Aid office and their website at <http://www.ncat.edu/admissions/financial-aid/aid/loans/sub-vs-unsub.html>.

### **Scholarships and Fellowships**

The majority of scholarships and fellowships at NC A&T State University are awarded through the academic department. Students are strongly urged to contact their academic department for additional scholarship information. Students receiving an outside scholarship should forward a copy of the notice to the Student Financial Aid Office. The scholarship will be included in the student's award and may cause an adjustment to the current award package. All scholarship checks should be made payable to North Carolina A&T State University and mailed to the Treasurer's Office. The check should include the student's name and social security number.

### **Graduate Assistantships**

Graduate assistantships are available to graduate students who have been admitted to a graduate degree program at A&T, maintain full time status, are in good academic standing, and are making satisfactory progress toward their degrees. Graduate students who have completed their course work requirements and are working on their thesis or dissertation with less than full-time course load may be eligible for teaching and research assistantship in their final semester. The types of graduate assistantships are described below.

#### Graduate Teaching Assistantship (GTA):

A Graduate Teaching Assistantship's primary purpose is to assist the student in strengthening and successfully completing his/her academic program. It includes activities that are relevant to the student's program of study, provides training to the student in teaching, and contributes to the university's teaching mission.

GTAs are selected based on their academic credentials and perform duties in their area of expertise. GTAs receive a stipend and in-state tuition. In-state tuition may be paid by the hiring unit or the Graduate College. The Graduate College also awards a limited number of tuition remissions on a competitive basis to out-of-state students that pays the difference between out-of-state and in-state tuition.

### Graduate Research Assistantship (GRA):

A Graduate Research Assistantship's primary purpose is to assist the student in strengthening and successfully completing his/her academic program. It includes activities that are relevant to the student's program of study, provides training to the student in research, and contributes to the university's research mission.

GRAs are selected based on their academic credentials and perform duties in their area of expertise. GRAs receive a stipend and in-state tuition and is consistent with the approved award/contract from the funding agency. The Graduate College also awards a limited number of tuition remissions on a competitive basis to out-of-state students that pays the difference between out-of-state and in-state tuition.

### Graduate Administrative Assistantship (GAA):

GAAs support a variety of academic and non-academic functions of the university. Their duties may be unrelated directly to teaching or research. GAAs are selected based on criteria established by the hiring units. The Graduate College does not prescribe stipend levels for GAAs; instead they are compensated according to the hourly rates established by the Division of Human Resources. GAAs are employed on campus in positions designated as Student Assistant IV or Student Assistant V. In addition to positions posted independently by hiring units, the Division of Student Affairs coordinates the posting of positions at <http://www.ncat.edu/student-affairs/student-services/career-services/pdf/StudentEmployment.pdf>. The Graduate College does not award tuition remission to GAAs.

### Appointment

North Carolina Agricultural and Technical State University provides equal employment opportunities for all persons regardless of race, religion, color, national origin, gender, age, disability, veteran status, political affiliation, genetic information, sexual orientation or sexual identity.

All GTAs and GRAs should receive academic year appointments (if appointed in fall) or spring appointments (if appointed in spring). A separate appointment for summer term can be made depending on the source and availability of funding and approval of the supervisor.

Notification of awards should be in the form of a contract using the form authorized by the Graduate College. The notification should contain information about the appointment period, compensation, expected duties, teaching and research load, review and renewal procedures, and tuition remission, if any.

### Renewals

Continuation of graduate assistantship support from year-to-year or semester-to-semester is not guaranteed. Renewal of support is based on a number of factors including: (a) satisfactory progress toward degree completion, (b) satisfactory completion of prior assistantship responsibilities, (c) enrollment status, (d) academic standing, (e) completion of training requirements, (f) evaluation and (g) availability of resources.

### Termination

A Graduate Assistantship may be terminated before the expiration of its designated term due to loss of funding, for cause, for academic delinquency, by written notice, and by voluntary mutual agreement.

- *Loss of Funding.* A graduate assistantship may be terminated due to a loss, reduction, or reallocation in appropriation, grant, contract, gift, or other funds with which to support the appointment.
- *Cause.* The following are examples of sufficient cause for removal: incompetence, inefficiency, wanton carelessness or neglect of duty, violation of research ethics, violation of safety protocols, insubordination, and repeated or extended absence.

- *Academic Delinquency.* Not making satisfactory academic progress toward a degree or is otherwise not in good academic standing.
- *Voluntary Agreement.* With the agreement of the University, an appointment may be terminated by the voluntary written resignation of the GA.

If an assistantship is terminated for any reason in the middle of the semester, in-state tuition and any out-of-state differential tuition remission will be prorated.

### Appeals

The Assistantship & Fellowship Committee of the Graduate Council considers appeals of termination of Graduate Assistantships.

Before filing an appeal, a graduate student is expected to attempt to resolve the termination issue with the hiring faculty member and/or department chairperson and dean of the academic unit in which the assistantship is assigned. A graduate student who is unable to resolve issues with the hiring faculty member and/or department chairperson has thirty (30) calendar days from the date of termination, or thirty (30) calendar days after the adverse decision at the department or college level to file an appeal with the dean of the Graduate College. Graduate students are responsible for submitting a written appeal with the required documentation to the dean of the Graduate College so that they are postmarked or hand-delivered by the deadline date. If a request for appeal is not postmarked or hand-delivered by this deadline, it will not be considered. The decisions of the Assistantship & Fellowship Committee are final and do not set precedent; each case is considered on its own facts and merits.

### Compensation

In accordance with the Office of Management and Budget (OMB) requirements, the University's Equal Employment Opportunity (EEO/AA) Statement (<http://www.ncat.edu/hr/policies/index.html>) and EEO/AA certification in the Federal Government's System for Award Management (SAM.gov), compensation for Graduate Assistants must be treated the same under like circumstances. This principle requires the University and its academic units to hire graduate students doing similar kinds of work through the same mechanism at similar rates, including pay scales and tuition charges. Equal compensation is mandated by the following: the Equal Pay Act of 1963, Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act of 1967, and Title I of the Americans with Disabilities Act of 1990. Therefore, the University must pay equal compensation to Graduate Assistants who perform jobs that require substantially equal skills, effort and responsibilities, and that are performed under similar working conditions within the University.

Departments should develop and monitor their procedures for consistency and to ensure that individuals are paid in accordance with published pay scales and in accordance with the legal requirements cited above. Graduate assistants in similar disciplines and at the same stage in their career will receive the same amount of assistantship. For example, all GRAs with similar skills, effort and responsibilities in a PhD program in the same discipline shall be paid the same.

All GTAs at each degree level will receive the same amount of assistantship as specified by the Graduate College. The Graduate College will also prescribe a minimum level of compensation for GRAs. The salaries will be competitive and ensure fairness. Each college or academic discipline may set a higher stipend rate for GRAs in consultation with the Graduate College. The Graduate College will ensure equity for GRAs within the following broad discipline categories used by the Council of Graduate Schools: (i) Physical and Life Sciences, Health Sciences, Mathematics, Computer Science, Agriculture, (ii) Engineering, (iii) Social Sciences, (iv) Arts and Humanities, (v) Education, (vi) Business, (vii) Other (Family and Consumer Sciences, Communications/Journalism, Public Admin, Social Work).

### Tuition Remission

Tuition remission refers to funds allocated by the Graduate College to offset a graduate student's tuition. A GTA or GRA who is in-state for tuition purpose may receive an in-state tuition remission that pays the entire in-state tuition. On a competitive basis, selected GRAs and/or GTAs who are out-of-state for tuition purpose may receive the differential out-of-state tuition remission, in other words, the difference between the total tuition for an out-of-state student and in-state student.

### Evaluation

An assistantship necessitates periodic assessment and feedback regarding a student's performance. Each department is responsible for review and evaluation of graduate assistants and may include written assessment of work by faculty supervisor, classroom visitation by designated faculty members, and written student evaluations. The evaluations must be submitted to the Graduate College at the end of each semester.

### Training

All graduate assistants are required to undergo training as specified by the Graduate College.

To keep the GTA appointment, the initial GTA training must be completed during the first week of the semester. In addition, GTAs will be required to attend specified training sessions throughout the academic year. Before assuming teaching assistant duties that require contact with students, a non-native, non-primary-English-speaking graduate student must also be certified as proficient in oral and written English.

To keep the GRA appointment, the initial GRA training must be completed during the first week of the semester. In addition, GRAs will be required to attend specified training sessions throughout the academic year. GRAs will be required to undergo training in research ethics, conflict of interest, responsible authorship, intellectual property rights, publications and patent policy, and other topics mandated by federal and state regulations. All GRAs are required to receive lab safety training (laser safety, chemical hazard safety, etc.) before working in any lab.

### Administration

All assistantships must be recommended by a senior university administrator (member of the Chancellor's Cabinet or a Dean). All assistantships must be funded from approved university accounts with adequate funding in the assistantship line item. Personal funds cannot be used to support assistantships. The Graduate College will administer all assistantships and will be responsible for post audit reports to track and monitor compliance with these policies, adherence to fiscal regulations, etc.

### Code of Conduct

A Graduate Assistant's teaching, research, and administrative activities are subject to the ethical precepts and codes of the academic profession, the laws of the State of North Carolina regarding its employees, the laws of the United States, and University policies governing institutional obligations. Violation of any of these requirements constitutes a basis for disciplinary action in accordance with procedures set forth in the University's policies. In their interactions with students, faculty, and all other members of the university community, GAs are expected to conduct themselves with professionalism, ethics, sensitivity and thoughtfulness.

## Academic Policies and Regulations

### Graduate Admissions

Graduate education is intended to develop specialized skills, knowledge and expertise in a particular discipline. Therefore the graduate admission process is designed to collect credentials regarding the applicant's academic preparation, intellectual ability, experience, and motivation to undertake a rigorous academic program of study. Admission of graduate students is the responsibility of the Dean of the Graduate School with the advice and assistance of the Graduate Council and of the graduate faculty members of the departments, programs, and curricula authorized to offer graduate degree programs. The application materials for each prospective student receive individual attention and are reviewed by the Graduate Coordinator in consultation with the admission committee consisting of graduate faculty within the intended program to identify whether the applicant's background matches the intended program of study. The program coordinator submits a recommendation based on a holistic review of each application. This review includes the applicant's academic qualifications, the applicant's interest and experience relative to the program, and the capacity of the program. The applicant's academic qualifications are judged on a number of criteria that may include grades on individual courses, overall grade point average, accreditation status of prior colleges/universities attended, standardized test scores, language proficiency, strength of recommendation letters, and additional criteria specified by the academic program. Each program weighs each of these criteria differently. The applicant's interest and experience relative to the program is assessed through the personal essay, history of prior research and work experience, clinical skills, and in some cases, through personal interviews. The academic program determines its capacity for admitting new students based on its current resources and enrollment of continuing students in the program. After receiving a recommendation from the program coordinator, the Graduate School reviews the application file to ensure that the appropriate procedures have been followed. This process ensures that all applications to graduate degree programs undergo two levels of review prior to an admission decision. Applicants who are offered admission will be selected on the basis of the University's analysis of the applicant's qualifications for satisfactory performance in the specific college, school, department, curriculum, or other program to which the applicant seeks admission. Admission to the University also requires satisfactory evaluation of campus safety related responses.

NCA&T considers all applications for graduate admissions without regard to race, ethnicity, color, gender, gender identity, sexual orientation, national origin, disability, veteran's status, age, religion, or creed.

Types of Admission: Students are admitted to the Graduate College in three categories: unconditional, conditional, or non-degree seeking. The minimum criteria for each type of admission are listed below. However, satisfying minimum admission requirements does not guarantee admission. Admissions decisions are based on a competitive evaluation and may be limited for such reasons as capacity constraints. Specific requirements for admission to each graduate program may be more restrictive and are subject to change.

### Unconditional Admission

Unconditional admission may be granted to an applicant who possesses:

- a. A bachelor's degree from an accredited four-year college or university as determined by a regional accrediting agency, or from selected international colleges/universities including three-year colleges and universities in Europe participating in the Bologna Process;
- b. Satisfactory cumulative Grade Point Average (GPA) in previous college work. A graduate degree, or at least 12 credit hours of graduate coursework taken post-baccalaureate while in graduate status, may supersede the undergraduate record in evaluating credentials for admission;

- c. Satisfactory evaluation of standardized test scores, recommendation letters, application essay, and other factors as specified by the intended program of study; and
- d. English language proficiency.

### **Conditional Admission**

Conditional admission may be granted when the Graduate College determines the student has not met the requirements for unconditional admission. This may be due to the lack of accreditation of the prior college/university, minimal relevance of previous education/degree to proposed program of study, or lack of academic strength as demonstrated by previous GPA or test scores. Conditionally admitted students will be subject to admission conditions that may include one or more of the following:

- a. Pass examinations to demonstrate knowledge in specified areas;
- b. Take specified undergraduate and/or graduate courses to improve his/her background. This will increase the total credit hours required beyond what is published in the catalog;
- c. Conditionally admitted students will be dismissed without a probationary period if the conditions placed on their admission have not been met within the prescribed time period.

### **Satisfying conditional admission status**

The Graduate College grants full graduate standing when all requirements of the conditional admission are met. All admission conditions must be satisfied during the first twelve (12) attempted credit hours. The student must also maintain a satisfactory academic record (3.0 GPA) on all course work taken in a graduate classification.

### **Non-Degree Seeking Admission**

Non-Degree Seeking or Post Baccalaureate Studies (PBS) admission is available for those who want to take courses for personal enrichment, professional growth, or certification requirements. However, at the discretion of the academic department, PBS students may apply up to twelve (12) credit hours to any certificate or degree program to which they are admitted in the future, subject to the Graduate Transfer Credits policy. Some academic departments restrict their courses to degree-seeking students only. Admission as a PBS student requires an application, application fee and undergraduate degree transcript. The PBS option is not available to international students on F-1 visa. Furthermore, all forms of financial assistance including federal financial aid are not available for PBS students.

### **Admission of Non-Degree Seeking Students to Degree Programs**

Students who are currently or have previously been enrolled as non-degree seeking students (PBS) and wish to obtain a graduate degree must formally apply to the graduate program with a new application, application fee and required documentation.

### **Deferral of Admission**

An admitted student may submit a written request to the Graduate College to defer admission to a future semester. Admission deferrals may be requested for a maximum of one year. The Graduate College must approve this request. A student's admission may be rescinded if the student does not enroll in the semester in which he/she received admission and does not receive approval of deferral.

### **Readmission**

A student must reapply for admission if his/her enrollment has been terminated for any reason including non-compliance with the continuous registration policy. A student must also reapply if he/she does not enroll in the semester for which he/she was admitted and has not received a deferral of admission. In such cases, the student must submit the complete application packet including the application fee as if applying for the first time. However application materials submitted within one year prior to readmission may be transferred to the new application.



## **Application deadlines**

Two types of deadlines apply as follows.

- a. Priority Deadline is the date by which complete applications must be submitted to receive priority review for merit based graduate awards and for admission to space constrained graduate programs. Applications received after the priority deadline will be given consideration based on availability of funds and/or space in the program.
- b. General Deadline is the date by which all application materials including original documents must be received by the Graduate College for admission decision. Some academic programs have earlier deadlines, in which case the complete application must be submitted by the posted departmental deadline.

## **Application Requirements**

All applicants must apply using the online admission portal that is accessible from the Graduate College's website. The application and admission process consists of a departmental evaluation based on the application, recommendation letters and unofficial copies of transcripts and other materials followed by a final review of all original documents by the Graduate College. All programs require the graduate admission application, application fee, transcripts, and a personal statement. Most programs also require recommendation letters. Many programs require standardized test score and/or resumes. Some programs have additional requirements such as an on-campus interview. The Graduate College maintains program specific requirements. All documents submitted to the Graduate College will be retained and will not be returned to the applicant nor released to a third party, except as legally required. A general list of application documents is set out below.

- a. Application for admission to the Graduate College;
- b. Application fee;
- c. Official academic transcripts from previously attended colleges and universities. International transcripts may require an external evaluation as determined by the Graduate College. Applicants who enrolled at North Carolina A&T State University after 1988 are not required to submit their original North Carolina A&T transcript;
- d. Recommendation letters preferably from faculty or professionals who are familiar with the applicant's work;
- e. Standardized graduate test scores as appropriate for intended program. The scores must be officially issued and current (no more than five years old);
- f. Personal statement of interest in the program, as required;
- g. All applicants are required to demonstrate proficiency in English. Applicants receiving any degree from an accredited U.S. college or university or from a college or university located in a country with English as an official language and the language of instruction in higher education (a list of countries is maintained by the Graduate College) will not require additional documentation. Otherwise, a satisfactory TOEFL (<http://www.ets.org/toefl>), IELTS (<http://www.ielts.org>) or PTE Academic (<http://pearsonpte.com/PTEAcademic/Pages/home.aspx>) score is required. TOEFL, IELTS and PTE Academic scores must be officially issued and are reportable for a period of two years from the date of the exam;
- h. Satisfactory criminal background check if requested by the Graduate College;
- i. International applicants are required to provide A&T with verification that the required funds are available to support the proposed program of study by submitting the Financial Guarantee Form to the International Students and Scholars Office. The applicant must also provide information regarding current visa status;
- j. Additional requirements as specified by the academic program.

## **Graduate Admissions Appeals**

An applicant to any graduate program who has been denied admission may appeal the University's decision but only on the grounds that the denial was based on a violation of the University's published admission policy or that it resulted from a material procedural error in the admissions process. The appeal must be in writing, must set forth with specificity the grounds for the appeal, and must be submitted to the Dean of the Graduate College within 30 days after the appellant has received the letter communicating the University's decision.

Upon receipt of the appeal, the Graduate College Dean will consider the recommendations of the Admissions Committee of the Graduate Council and will communicate his or her decision in writing to the applicant-appellant within thirty (30) calendar days of receipt of the appeal. The Dean may consult the appropriate program coordinator, department chair and/or academic school/college Dean in arriving at a conclusion. If the Graduate College Dean's decision is in favor of the applicant, the applicant will be admitted to the next available term. After hearing the Dean's decision, the applicant may appeal to the university Provost within two weeks of receiving the decision.

Appeals must be received prior to the term for which the applicant is seeking admission. If there is insufficient time to complete the appeal process before the beginning of the term for which the applicant seeks admission, the Dean of the Graduate College may decline to review the appeal.

## **Enrollment, Residence, Leave and Withdrawal**

### **Full time enrollment**

A graduate student is considered to be enrolled full-time when registered for a minimum of nine (9) semester credit hours during a regular fall/spring semester. If a student is full time in the previous spring semester and is registered for the following fall semester, he/she is considered to be full time in the summer. Otherwise, a student is considered to be enrolled full-time in each summer session if he/she is registered for a minimum of six (6) credit hours. During the semester of graduation, registration in any number of credit hours will be considered full-time enrollment. Students seeking federal financial aid must adhere to the enrollment requirements prescribed by the University's financial aid office.

### **Maximum Course Load**

No more than 15 credit hours may be taken in any fall or spring semester and no more than seven (7) credit hours may be taken in any summer session without the written permission of the graduate program coordinator and/or department chair and the dean of the Graduate College.

### **Residence Requirement**

The residence requirement for a graduate program is met when a student has earned at least 60% of the required degree credits for his or her program through enrollment in courses offered by North Carolina A&T State University. If the program is offered as part of a consortium, then a student should earn at least 60% of the required degree credit for his or her program through enrollment in courses offered by A&T or any of the universities in the consortium.

### **Continuous Enrollment/Registration**

Graduate students must continue to register each semester (except summer terms) until all degree requirements are completed. Students must be enrolled at A&T during the semester of graduation.

### **Leave of Absence**

In special circumstances, a student in good academic standing may request a leave of absence from his/her program of study. The student must notify the graduate program coordinator, department chair and Dean of the Graduate College. The request should be made at least one month prior to the semester

involved. The request should be endorsed by the student's graduate advisory committee, program coordinator and/or department chair, and the Graduate College. The time that the student spends on an approved leave of absence will be included in the maximum time allowed to complete the degree.

### **Withdrawal from the University**

A student who wishes or is asked to leave the University at any time during the semester shall complete and file official withdrawal forms. The forms must be completed and submitted to the Office of the Registrar. Failure to execute and file these forms in a timely manner will result in a student incurring the penalty of receiving an "F" for each course in which he or she was enrolled during the semester in question.

## **Graduation Requirements**

### **Graduation and commencement dates**

Graduate students will be awarded their degrees or certificates on four official graduation dates each year: June, August, December and May. These dates coincide with the end of the fall and spring semesters and twice during the summer session. Formal commencement exercises are held at the end of the spring and fall semesters. Any student who graduates during summer sessions is eligible to participate in the December commencement. Students must be enrolled in the semester in which they apply for graduation.

### **Student's responsibility to know university policies and regulations**

It is each student's responsibility to be knowledgeable of the published academic regulations and requirements set forth in the Graduate Catalog, its revisions, university policies and regulations, and specific requirements of the academic programs. The student is also responsible for compliance with announcements published by the department, Graduate College, Registrar, Provost and other university offices. Lack of knowledge of regulations and requirements does not excuse the student from complying with academic regulations and meeting the requirements.

### **Applicable Graduate Catalog and program requirements**

The Graduate Catalog provides general information only and does not constitute an irrevocable contractual agreement between a student and North Carolina A&T State University. A student may expect to earn a degree in accordance with the requirements of the curriculum described in the official Graduate Catalog in effect when he or she first enters the university, or in any subsequent catalog published while he or she is a student. The student may elect to follow a newer catalog with the approval of his/her department chair. However, the time limitation for graduation as indicated later in this policy will not be extended. The specific curricular requirements are stated in the student's Plan of Study. The University reserves the right to make changes in curricula, degree requirements, course offerings, or academic regulations at any time when, in the judgment of the graduate faculty, the Chancellor, and/or the Board of Trustees, such changes are in the best interest of the students and the University. When that occurs, the revised catalog will apply to new students.

### **Plan of Study**

All graduate students are required to file a Plan of Study by the end of the second semester after admission to a program of study. Failure to submit the Plan of Study will prevent the student from enrolling in classes for his/her third semester. The Plan of Study is established in consultation with the advisor, graduate coordinator and/or department chair. The Plan of Study is based on the Graduate Catalog requirements but may be structured to meet the specific needs of the student. The Plan of Study may be amended at any time before the student applies for graduation with the approval of the advisor, graduate coordinator and/or department chair. A student's Plan of Study must be approved by his/her advisor and chairperson. Responsibility for meeting all academic requirements for a selected program rests with the student.

### **Change of Program**

After a student has been admitted to a degree program, he/she may petition to change degree programs using the appropriate form available from the Graduate College. The completed form must be approved by the Department Chairs of the old and new programs. The petition to change programs must include a new Plan of Study for the new program and should be submitted and approved prior to the start of the effective semester. A student who petitions successfully for transfer to a new degree program must complete the new program requirements in force at the time of the change of program. Any courses credited from the old program must meet the time frame requirements for completion of the new program. This process of changing programs only applies to changing from one program to another in a related discipline at the same degree level. It cannot be used to change academic status or degree level.

### **Time Limitations**

The master's degree program must be completed within six (6) successive calendar years. Doctoral programs must be completed within ten (10) successive calendar years. Normally, this time limit will apply even if a student changes his/her program of study. When the program of study is interrupted because the student has been drafted into the armed services, the time limit shall be extended for the length of time the student has been on active duty, if the candidate resumes graduate work no later than one year following his/her release from military service. A student may petition for an extension of the time limits under extenuating circumstances, for example, a long term illness.

### **Graduation requirements**

Students intending to graduate must comply with all graduation requirements stated below:

- Have an approved Plan of Study filed in the Graduate College at least one semester prior to graduation
- Have transfer of credits, if any, approved and noted on Plan of Study at least one semester prior to graduation
- Conditionally admitted students must have been approved for unconditional status at least one semester prior to graduation.
- Submit the Report of Doctoral Dissertation Committee or Thesis Committee (as appropriate)
- Resolve prior semester incomplete grades
- Be in good academic standing
- Pay required tuition and fees and any other pending payments
- Meet all requirements specified on the Plan of Study with an overall Grade Point Average of 3.00 or higher
- Apply for graduation by the posted deadline
- Enroll in the semester of graduation

### **Application for Graduation and Graduation Clearance**

The University requires a non-refundable \$60 Graduation Fee when applying for graduation. The application for graduation must be made by the posted deadline (see for example, [University Academic Calendar](#)). Students who fail to apply by the application deadline may apply for graduation by the extended deadline on payment of an additional \$20 late fee. The University cannot ensure that the names of late filing applicants will appear in the Commencement Program. The fee is assessed for students once the first step is completed.

A student who applies for graduation but is unable to complete degree requirements in the current semester must withdraw the graduation application by the posted deadline. The student will be required to reapply for graduation in a later semester and pay the graduation fee again.

The student's diploma will be mailed to the address provided on the graduation application. Regalia and other academic paraphernalia is ordered from the University Bookstore. For information on ordering contact them by phone at (336) 334 - 7593 or visit them online at <http://www.ncat.edu/divisions/business-and-finance/aux-services/bookstore/>.

## **Course Numbering**

### **Lower Division Courses**

**100-199** level courses are intended primarily for freshmen. Upper division students may enroll in these courses. Graduate students may enroll in these courses with their advisor's approval, but they are not available for graduate credit.

**200-299** level courses are intended primarily for sophomores. Certain classes are closed to freshmen who lack the designated prerequisites or whose majors are outside the unit offering the course. This information is available in the *Undergraduate Bulletin*, or from the student's academic advisor. Upper division students may enroll in these courses. Graduate students may enroll in these courses with their advisor's approval, but they are not available for graduate credit.

### **Upper Division Courses**

**300-399** level courses are intended primarily for juniors. Prerequisites and other restrictions should be noted before registration. Graduate students may enroll in these courses with their advisor's approval, but they are not available for graduate credit.

**400-499** level courses are intended primarily for seniors and include capstone courses, study abroad, etc. Prerequisites and other restrictions should be noted before registration. Graduate students may enroll in these courses with their advisor's approval, but they are not available for graduate credit.

**If undergraduate and graduate courses need to be co-listed, then this can occur between 400- and 600-level courses. Undergraduates may take 600-level courses with senior status and a minimum 3.25 GPA or above.**

### **Graduate Courses**

**600-699** courses are master's level courses open to all graduate students. Undergraduate students may take these with senior status and a minimum 3.25 GPA or above, or in special cases as part of an accelerated bachelors-master's program.

**700-799** courses are master's level courses open to all graduate students.

**800-899** courses are doctoral level courses open to all graduate students.

**900-999** courses are doctoral level courses open only to doctoral students.

Each graded and non-graded course will be assigned to a faculty member. In particular, non-graded courses such as Special Topics, Seminar, Independent Study, Thesis, and Dissertation will associate a separate section with each faculty member.

### **Course Prefixes**

Prefixes will contain no more than four alpha characters. Departments should consult with the University Registrar when establishing courses which will require a course prefix other than the departmental abbreviations.

## **Graduate Grades and Grade Point Average**

### **Responsibility for grades**

A student's performance in a course must be evaluated resulting in a course grade by the instructor of record assigned to the course. The only exception is when the instructor is not available due to illness or termination from employment. In this event, the department chair or dean shall request the change of grade.

A request for a change of grade must be initiated by the instructor of record assigned to the particular course. The request must be approved by the instructor's department chair and dean. The only exception to an instructor's involvement in seeking a change of grade is when a grade appeal results in a change of grade. In this event, the department chair or dean shall request the change of grade.

The registrar will email the instructor and department chair (or dean if there is no department chair) to confirm that the change of grade originated from the instructor who signed the change of grade form.

Each instructor who assigns grades has the responsibility to implement grading procedures that are fair and equitable, and to provide a reasonable evaluation of the student's performance in the course. The instructor is expected to inform all students at the beginning of the semester of the means to be used to determine grades in each course or section. This information must be included in the instructor's course syllabus.

### **Types of grades**

The following grades may be awarded in graduate courses.

#### Graded courses

This section provides a list of all grades that may be awarded for graded courses, that is, courses that are taken both for credit and for a letter grade. Letter grades A, A-, B+, B, B-, C+, C and F correspond to a specified grade point value. The student's Grade Point Average (GPA) is calculated by adding quality points for all courses where the quality points for a course equal the grade point value times semester credit hours. Some grades do not have associated quality points and are not included in GPA calculation.

- A (Excellent); 4.0 points
- A-; 3.7 points
- B+; 3.3 points
- B (Average); 3.0 points
- B-; 2.7 points
- C+; 2.3 points
- C (Below average); 2.0 points
- F (Failure); 0 points
- AU (Audit); not included in GPA
- I (Incomplete); not included in GPA
- CR (Transfer Credit); not included in GPA
- CE (Credit by Examination); not included in GPA
- W (Withdrawal Voluntary); not included in GPA
- WM (Withdrawal, Medical); not included in GPA
- WA (Withdrawal, Administrative); not included in GPA

#### Non-Graded courses

Certain courses are non-graded or taken for credit only. These include Continuation/Residency, Dissertation, Internship/Field Experience, Project, Seminar, Supervised Research, Supervised Teaching,

and Thesis. The following grades may be awarded for courses that are non-graded or are taken for credit only.

- S (Satisfactory)
- U (Unsatisfactory)

Additionally, the following examinations, if required in the program, are recorded as either being Satisfactory (or completed) or Unsatisfactory (not completed): Comprehensive Examination, Qualifying Exam, Preliminary Exam.

The S or U grade for a non-graded or credit-only course or for a required examination will have no effect on the student's grade point average. However, courses with a required course with an S/U grade must be completed with a grade of S. A student with a grade of U in a required course will not have fulfilled his/her Plan of Study and will not be permitted to graduate. Similarly, required examinations must be passed before a student is permitted to graduate.

### **Attempted Credit Hours**

All courses taken, irrespective of grade, are included in calculating attempted credit hours. Furthermore, all courses in which a grade of C or higher or a grade of S is earned are included in calculating earned credit hours.

### **Graduate Credit**

Only courses numbered 600 or higher can be counted toward completion of graduate degrees or certificate programs. Grades for courses taken for graduate credit while an undergraduate at North Carolina A&T State University, in Post Baccalaureate Studies (PBS) classification, or transferred from other universities must have a grade of "B" or better to be transferred. "B-" is not a "B" or better.

### **Grade Point Average**

To determine the Grade Point Average for a term, first determine the total quality points earned in the term by multiplying the number of grade points awarded for each course by the course's assigned number of semester credit hours and add the resulting quality points earned for each course in the term. Then divide the total quality points earned in the term by the number of semester credit hours attempted (for courses that award letter grades) in the term. The following rules apply in calculating graduate student GPA.

- All courses numbered 600 or higher taken in a graduate classification or for graduate credit as an undergraduate are included in the graduate GPA.
- When students repeat a graduate course, all grades including the last grade will be utilized to calculate the cumulative graduate average.

### **Incomplete Grades**

Students cannot graduate with an "I" grade on their transcript. "I" grades must be resolved during the next semester after taking the course. Otherwise, a grade of "F" or "U" will be automatically assigned. When a grade of "I" converts to "F", this may result in an action of probation or dismissal for the semester in which the conversion takes place, even if the student is not registered for the semester in which it converted.

### **Change of Grade**

A change of grade, if any, must be made within one year from the date the original grade was received.

### **Course Repetition**

Graduate courses may be repeated only once with the permission of the student's graduate program coordinator and/or department chair and approval of the Dean of Graduate Studies. Degree credit for repeated courses will be given only once, but the grade assigned for each enrollment shall be permanently recorded. Both the original grade and the grade received in the repetition will be used in calculating the overall GPA.

A student may not repeat a course in which “C” or above was earned. A student may repeat a required course in which “F” or “U” or “W” was earned. A student may not repeat the course more than once. If a student attempting a course for the second time (after a grade of F, U or W) either fails or withdraws from the course, he/she may be dismissed from the degree program. All hours attempted in graduate courses and all grade points earned are included in the computation of the cumulative average of a graduate student.

### **Failure to meet course requirements**

A student who stops attending a course and/or fails to meet course requirements without officially withdrawing from the course may be assigned a grade of “F” or “U”.

### **Failing to withdraw by deadline**

Students who withdraw from the University prior to the published deadline to withdraw from the University shall receive a “W” in all classes enrolled. Failure to execute and file these forms in a timely manner will result in a student receiving an “F” or “U” for each course in which he or she was enrolled during the semester in question.

### **Graduate Transfer Credits**

This policy applies to course credits transferred from other institutions. The University is not obligated to accept any courses for transfer credit. However, provided the student meets the residency requirement, the graduate program coordinator and/or department chair may recommend up to 40% of the required credit hours for a degree program at North Carolina A&T State University be accepted for transfer credit from another institution, subject to approval by the Dean of the Graduate College. The limitations on transfer credits are as follows:

1. For a course to be transferred, it must have been earned at a regionally accredited, or otherwise approved, university with a grade of “B” or higher (“B-” is not equivalent to a “B”). Courses that have been graded on a Pass/Fail or Satisfactory/Unsatisfactory basis will not be accepted for transfer.

Although the credit for a course may transfer, the grade will not be used to calculate the cumulative Grade Point Average (GPA) at North Carolina A&T State University except when the course is a consortium course. The number of semester credit hours transferred from courses taken in a quarter system will be two-thirds of the quarter hours.

2. With the approval of the academic department and the Graduate College, graduate level credit hours may be credited to a graduate program at NCA&T provided the total number of credit hours transferred do not exceed 40% of the total degree requirements at NCA&T. Credit hours transferred may not have been used to fulfill requirements of any previous earned degree at another institution. However, subject to approval by the academic department and the Graduate College, up to 24 credit hours of graded course work from a previous earned master’s degree may be approved for transfer credit towards a post-baccalaureate doctoral program.
3. A maximum of 12 credit hours taken while a student is in non-degree seeking or Post Baccalaureate Studies (PBS) status may be credited to a degree program.



4. The request must include an official copy of the transcript and published course descriptions along with the request.
5. Transferred courses must be graduate-level courses relevant to the graduate degree being sought. Each graduate program will recommend transfer credits based on an evaluation of the course description and whether the course was taken within the last five years.

## **Academic Eligibility**

### **Good academic standing**

To maintain good academic standing and to meet the requirements for graduation, a student must demonstrate acceptable performance in course work after being admitted to a graduate program. This requires a minimum cumulative Grade Point Average (GPA) of 3.00 or higher in all graduate course work.

Furthermore, good academic standing requires satisfactory progress in the overall graduate program. The student's advisor or graduate advisory committee may render judgments as to whether satisfactory progress is being made toward the degree, taking into account all aspects of academic performance and promise, not necessarily course work alone. Departments may recommend termination of a student's graduate status at any time if the student is not making satisfactory progress toward the degree. Examples of unsatisfactory progress may include, but are not limited to, inadequate GPA, inadequate research and/or research skills, failure to obtain satisfactory grades in required courses for the program, or failing the candidacy, comprehensive, or final oral examination.

### **Academic Probation**

Any student who has either (i) attempted 18 or fewer credit hours and received a semester GPA of less than 3.0 or (ii) attempted more than 18 credit hours and received less than a 3.0 cumulative GPA will be placed on academic probation.

- A student on academic probation with 18 or fewer attempted credit hours will be required to earn a semester GPA of 3.0 or higher by the end of the next regular (non-summer) semester to return to good academic standing
- A student on academic probation with more than 18 attempted hours will be required to improve his/her cumulative GPA to 3.0 or higher by the end of the next regular (non-summer) semester to return to good academic standing.
- Students on academic probation may not enroll in more than 9 semester credit hours.

### **Dismissal**

A student who is placed on probation after attempting 18 credit hours and who fails to improve his/her cumulative GPA to 3.0 or higher by the end of the probationary period, that is, by the end of the next regular (non-summer) semester, will be dismissed.

Departments may also recommend dismissal of a student at any time if a student:

- is conditionally admitted and fails to meet the conditions of his/her admission;
- is not making satisfactory progress toward the degree, for example, inadequate progress on research projects, failure to obtain satisfactory grades in required courses, or failing the candidacy, comprehensive, or final oral examination;
- receives an "F" grade in a required course;
- fails to maintain continuous registration without an approved leave of absence;
- fails to complete program requirements in the maximum allowed time for the degree; or

- is guilty of ethical misconduct or violates the North Carolina A&T State University's Student Handbook.

### **Readmission after Academic Dismissal**

A student who is dismissed for academic reasons will be eligible to submit a new application for admission to a degree or certificate program after one academic year and may be admitted only upon the recommendation of the major department chair or graduate coordinator and with the approval of the Dean of the Graduate College.

### **Appeals**

An academically dismissed student may appeal the decision according to the process outlined in the Graduate Student Appeals policy.

### **Thesis, Dissertation and Comprehensive Exam**

#### **Theses and dissertations**

A thesis or dissertation presents the results of the student's original investigation in the field of major interest. It must represent a contribution to knowledge, be adequately supported by data and be written in a manner consistent with the highest standards of scholarship.

#### **Thesis/Dissertation Research Topic**

The thesis/dissertation research topic must be approved by the thesis/dissertation advisory committee. Students whose research involves human subjects, animals, biohazards, or radiation must have their research proposals approved by the appropriate compliance committee before beginning their research.

#### **Qualifying Examination**

The Qualifying Examination is given to assess a doctoral student's competence in a broad range of relevant subject areas. Only students with unconditional admission status and in good academic standing may take the Qualifying Examination. A student may not register for dissertation credits before passing the Qualifying Examination. A student may be permitted to attempt the Qualifying Examination at most twice. A student who wants to retake the Qualifying Examination must apply to retake the Qualifying Examination by the posted deadline. A student not recommended for re-examination or who fails the exam on a second attempt will be dismissed from the doctoral program. While it is expected that the student takes the Qualifying Exam during his/her first year, he/she must take the exam before the end of three semesters or 27 attempted credit hours. A student who fails on the first attempt must retake the exam and pass it in the following semester, but no later than the end of the first four semesters or 36 attempted hours. The results of the qualifying exam will be communicated by the department to the Graduate College within 30 days from the date of the exam.

Each program will offer the qualifying examination at least once each semester (fall/spring) through a process administered by the graduate coordinator. The program handbook and website will clearly publish the exam format including subjects tested, number of questions from each subject, time allowed for each question and total exam duration, whether the exam is open book or closed book, written or oral, and passing score. Consequences of failing one or more parts of the exam will be clearly mentioned. All students taking the exam in the same academic year will receive the same exam format; therefore, any changes in the exam format will be published at least one year in advance.

#### **Preliminary Examination**

The Preliminary Examination is conducted by a doctoral student's dissertation committee and is an oral defense of the student's dissertation proposal. Only students with unconditional admission status, in good

academic standing, and a confirmed dissertation advisor may take the Preliminary Examination. A student may be permitted to attempt the Preliminary Examination at most twice. A student who wants to retake the Preliminary Examination must apply to retake the Preliminary Examination by the posted deadline. At least one full semester must elapse before the re-examination. A student not recommended for re-examination or who fails the exam on a second attempt will be dismissed from the doctoral program. A student who has not passed the Preliminary Exam by the time he/she has attempted 45 doctoral credit hours will be dismissed from the program. The results of the preliminary exam will be communicated by the department to the Graduate College within 30 days from the date of the exam.

Each program will offer the preliminary examination at least once each semester (fall/spring) through a process administered by the graduate coordinator. The program handbook and website will clearly publish the exam format including material tested, exam duration, whether the exam is open book or closed book, written or oral, and passing score. Consequences of failing one or more parts of the exam will be clearly mentioned. All students taking the exam in the same academic year will receive the same exam format; therefore, any changes in the exam format will be published at least one year in advance.

### **Admission to Candidacy**

A doctoral student will be admitted to candidacy upon successful completion of the Qualifying Exam and the Preliminary Oral Exam.

### **Thesis/Dissertation Defense**

The thesis/dissertation defense is conducted by the student's thesis/dissertation committee and is an oral defense of the student's final thesis/dissertation and is scheduled after the thesis/dissertation is completed. Copies of the thesis/dissertation must be presented by the student to his or her faculty advisor for review by the examining committee no later than one week prior to the defense of the thesis/dissertation. The examination may be held no earlier than one semester (or four months) after admission to candidacy. The results of the defense must be submitted by department to the Graduate College within 24 hours. Failure on the examination may result in dismissal from the program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the program.

### **Submission of Thesis/Dissertation**

After the thesis/dissertation has been successfully defended, the thesis/dissertation must be approved by each member of the student's thesis/dissertation committee. The student must submit the approved thesis/dissertation to the Graduate College by the deadline posted on the academic calendar, and must conform to the Graduate College's formatting guidelines for theses and dissertations. Prior to or at the time of submission, the student must complete and sign the Non-Exclusive Distribution Agreement granting North Carolina A&T State University a limited, nonexclusive, royalty-free, license to reproduce the thesis or dissertation in electronic form and make it available to the general public at no charge, subject to the embargo choice/publishing restrictions of the student. This form should be delivered to the Graduate College along with the original copy of the signature page bearing signatures of committee chair, department chair and/or dean of the school.

### **Thesis/Dissertation Advisor**

All students in graduate programs must have a graduate advisor who is a member of the graduate faculty in the student's major program. In the case of doctoral programs and master's programs requiring theses and/or final oral examinations, the thesis/dissertation advisor is the chair or co-chair of the thesis/dissertation committee and serves as the graduate advisor. It is the student's responsibility to reach mutual agreement with a thesis/dissertation advisor and, in consultation with the advisor, to select a thesis/dissertation committee consisting of graduate faculty members.

Master's student: A student pursuing a master's thesis should reach agreement with a full member of the graduate faculty to serve as his/her thesis advisor by the time he/she has attempted 18 credit hours. The Graduate Coordinator or Department Chair approves and submits the advisor and committee names on the student's Plan of Study by the end of the second semester to the Graduate College for final approval. A student who is unable to reach agreement with any qualified faculty member to serve as his/her advisor by the time he/she has attempted 18 credit hours may be approved to graduate under a non-thesis option; this will require a revised Plan of Study and approval by the graduate coordinator/department chair and the Graduate College.

Doctoral student: A doctoral student should reach agreement with a full member of the graduate faculty to serve as his/her dissertation advisor by the time he/she has attempted 27 credit hours. The Graduate Coordinator or Department Chair approves and submits the advisor and committee names on the student's revised Plan of Study by the end of the third semester to the Graduate College for final approval. A student who is unable to reach agreement with any qualified faculty member to serve as his/her advisor by the time he/she has attempted 27 credit hours will be dismissed from the program. In this case, the student may submit a new application for admission to another program at North Carolina A&T State University or may transfer to another institution.

### **Advisory Committee Role**

The primary function of the committee is to advise the student in all aspects of the educational program and to monitor and evaluate that student's progress toward the degree. The student is expected to meet with committee in formal sessions at appropriate intervals to critically assess the student's progress; such meetings may be requested by the student or by any member of the committee.

The advisory committee is responsible for the following aspects of the thesis or dissertation and the related or associated research experience:

- approval of the subject matter and methodology of the thesis or dissertation research;
- approval of the organization, content and format of the thesis or dissertation according to NCA&T guidelines;
- review of and comment on drafts of various sections of the thesis or dissertation, including (a) the quality of data and evidence, (b) logical reasoning, and (c) the editorial, linguistic and bibliographic quality;
- evaluation of the thesis or dissertation as a basis for certification that the student has fulfilled the requirements of the degree for which he or she is a candidate; and
- encouragement of and advice to the student and review of manuscripts based on the thesis or dissertation research for publication in the scholarly literature of his or her field.

### **Advisory Committee Composition**

The advisory committee for a master's thesis is composed of at least three members of the Graduate Faculty, including the committee chair. At least two committee members must be Full or Associate members of the graduate faculty. The student's advisor serves as chair of the committee and is a Full member of the graduate faculty. The advisory committee for a doctoral dissertation is composed of at least four members of the Graduate Faculty. At least three committee members must be Full or Associate members of the graduate faculty. The student's advisor serves as chair of the committee and is a full member of the graduate faculty. The Advisory Committee is selected by the student in consultation with his/her advisor. The members of the committee must be approved by the graduate coordinator or department chair. The Graduate College verifies the eligibility of faculty to serve on advisory committees when the Plan of Study is submitted. The Graduate College will appoint an additional external committee member for all doctoral dissertation committees. The Graduate College faculty representative serves on the doctoral dissertation committee with all the rights and responsibilities of any other member. In

addition, the Graduate College faculty representative also represents the Graduate College to (i) protect the interest of the University by ensuring that the dissertation meets the highest academic standards, (ii) provide assurance that appropriate procedures are followed; and (iii) provide an 'outside' point of view by sharing expertise with a new perspective or theoretical vantage that might not otherwise be available.

### **Committee Members from Other Institutions**

At most one of the required committee members may be selected from an external institution. If such a committee member is from another university, he/she must have graduate faculty status at his/her home institution; the program coordinator or department chair will provide evidence to the Graduate College before the appointment is approved. If the external committee member is from a non-academic organization, the appointment will be considered, and if appropriate, approved by the Graduate College after receiving a request and copy of the CV from the program coordinator or department chair. In all cases, it should be made clear to that person that he or she will be expected to participate in the comprehensive oral examinations.

### **Substitution of Committee Members**

Under extenuating circumstances, it may be necessary for a member of a graduate advisory committee to have a substitute at committee meetings or the exam. The substitution of a committee member on an oral examination must be requested in writing by the program coordinator or department chair and approved by the Graduate College in advance of the examination.

### **Permanent Changes in Committee Members**

- **Changes before Preliminary Examination.** Should the student, in consultation with his/her advisor, wish to change any of the committee members, he/she must submit a revised Plan of Study with the new members, indicating that this change has been approved by the advisor and by the graduate coordinator or department chair.
- **Changes after Preliminary Examination.** Changes in committee membership after the preliminary exam requires signatures of both outgoing and incoming committee members and the student, as well as justification for the committee change. Approval by the Graduate College is required before holding any examinations.
- Disagreements within the committee or between the student and a committee member over the quality of a student's performance are not grounds for reconstituting the committee.

### **Comprehensive Exams**

Students enrolled in a graduate program may be tested by a comprehensive examination to determine the student's knowledge and skills in a general subject area or a concentration. The comprehensive examination date will be announced by the departmental graduate committee chairperson at the beginning of the semester. This examination will be administered to the enrolled student by an examining committee of the department.

- a. Eligibility to sit for the examination will be determined by the departmental graduate committee and the results of the examination will be forwarded to the Graduate College no later than 30 days prior to the end of the semester.
- b. Students may only take the comprehensive examination twice. After the second failure, the student will be dismissed from their academic program.

## **Graduate Courses, Credits and Curriculum**

### **Semester Credit Hour**

The unit of academic work is the semester credit hour defined as one 50-minute lecture period (or at least two periods of laboratory or field work) per week throughout one fifteen week semester. Summer sessions are shorter in duration; however, the contact hours each week are increased proportionately.

Online or blended courses will have the same learning outcomes as those delivered in traditional classroom instruction. Because learning in online and blended courses may not be quantified in terms of class meeting time, emphasis is placed upon evidence of student learning.

### **Degree program**

A comprehensive course of study in a given disciplinary area identified by a unique CIP (Classification of Instructional Programs) code that leads to a master's or doctoral degree. The Registrar will maintain a unique major code for each degree program. Curriculum proposals for all graduate degree programs should be submitted to the Graduate Council, the Teacher Education Council (if teaching licensure option is included), and then to the Faculty Senate for approval. Students are formally admitted to a degree program. The name of the degree and the discipline appears on the student's plan of study, diploma and transcript.

### **Concentration**

A graduate degree program may offer concentrations within the major field of study that reflect areas of specialization. A concentration within a degree program is defined by a coordinated set of courses representing a minimum of 18 credit hours. All concentrations within a degree program share a common core consisting of at least 9 credit hours. Furthermore, all concentrations require the same total credit hours for graduation. The Registrar will maintain a unique major code for each concentration within a degree program. Curriculum requests for all graduate degree concentrations should be submitted to the Graduate Council, the Teacher Education Council (if teaching licensure option is included), and then to the Faculty Senate for approval. Students are formally admitted to a concentration within a degree program. The name of the concentration appears on the student's plan of study and transcript, but not on the diploma.

### **Option**

Options represent various pathways for a student to complete a degree program. All options will require the same total credit hours for graduation. Curriculum requests for all options within a graduate degree program should be submitted to the Graduate Council, the Teacher Education Council (if teaching licensure option is included), and then to the Faculty Senate for approval. A student is not admitted into an option. The option appears on the student's plan of study, but neither on the transcript nor the diploma.

### **Minimum credit hours for degree programs**

The following minimum graduate credit hours are required for each type of graduate program. Individual programs may require a higher number of credit hours to fulfill disciplinary accreditation requirements.

- a. Masters programs: 30 credit hours beyond bachelor's degree including at least 6 credit hours of thesis research for thesis-option
- b. Doctoral programs: 60 credit hours beyond bachelor's degree including at least 12 credit hours of dissertation research.

### **Comprehensive Assessments**

Graduate programs may require students to successfully complete a comprehensive assessment. The assessment may include a comprehensive examination (written and/or oral), a research project, thesis, dissertation, capstone course, portfolio, internship, field experience and/or equivalent. For details, students are referred to program/department handbooks.

### **Graduate Certificate Programs**

A graduate certificate program in a non-degree program that requires at least 12 credits. A graduate certificate program may be Post-Baccalaureate (if admission is offered after completion of a bachelor's degree) or Post-Master's (if admission is offered after completion of a master's degree). The catalog

information should clearly indicate whether a certificate is a (i) stand-alone certificate, (ii) add-on certificate to a complementary degree program or (iii) a continuing education/professional development certificate. The Registrar will maintain a unique code for each certificate program. Curriculum requests for all PB (Post-Baccalaureate) and PM (Post-Master's) certificate programs should be submitted to the Graduate Council, the Teacher Education Council (if teaching licensure option is included), and then to the Faculty Senate for approval. The name of the certificate appears on the transcript. A student may be admitted independently to a stand-alone certificate program or to a continuing education/professional development certificate program. However, an add-on certificate can only be pursued after admission to a degree program.

Post-baccalaureate and post-masters certificate programs are designed to provide specialized graduate level training in a focused area. The minimal criteria are:

- All courses comprising the certificate program must be at a level acceptable for graduate credit, i.e. a course numbered at 600 or higher.
- The minimum number of semester credit hours required for a certificate may vary from program to program, but must consist of at least 12 semester credit hours.
- Courses required by the certificate program must be taught by members of the graduate faculty.
- Admission requirements of the School of Graduate Studies must be met by an applicant.
- A student may be admitted to the School of Graduate Studies for a certificate program without being admitted to a degree program. A student may subsequently apply for admission to a degree program for which the certificate credit hours constitutes some portion of total requirements, subject to the Graduate Transfer Credits policy.

## **Graduate Double Majors, Dual Degrees and Joint Degree Programs**

### **Double Majors**

A graduate student enrolled as a double major may earn two degrees at North Carolina A&T State University by enrolling concurrently in two separate but related programs of study, both at the master's level. Note that a master's degree student continuing on for a Ph.D. is not considered a double degree major.

Double degree programs must balance structural efficiency with individual program integrity. At least 18 credit hours must be unique to each program. Students in double degree programs will have to comply with the requirements of both degree programs as stated in the double degree agreement.

A student must apply to and be accepted by both programs before officially beginning the double degree program. In a practical sense, this means that a student should either be accepted by both programs at the same time or be accepted to the second program by the end of the second semester in the first degree program. Double degrees will not be awarded after the curricular requirements for both programs have already been met without initial application.

Double degree proposals must be approved by the proposing departments and schools/colleges. In addition to the sharing of courses, proposal materials should include: a description of the participating units/degrees, an overview of the existing academic course of studies, the rationale and demand for the new double major, guidelines for academic eligibility and meeting the School of Graduate Studies regulations, and any other supporting materials to assist with a thorough review of the request. A letter of support from the chair or director of each participating unit stating faculty support must also accompany the proposal.

### **Dual Degree Programs**

Dual degree programs are those in which a student may enroll concurrently in two degree programs offered in two different academic units at two institutions, both at the master's level.

At least 18 credit hours must be unique to each program. Students in dual degree programs will have to comply with the requirements of both degree programs as stated in the dual degree agreement.

A student must apply to and be accepted by both programs before officially beginning the dual degree program. In a practical sense, this means that a student should either be accepted by both programs at the same time or be accepted to the second program by the end of the second semester in the first program. Dual degrees will not be awarded after the curricular requirements for both programs have already been met without initial application.

Dual degree proposals must be approved by the proposing departments and schools/colleges and their respective institutions. Dual degree programs are also subject to approval by SACS. In addition to the sharing of courses, proposal materials should include: a description of the participating units/degrees, an overview of the existing academic course of studies, the rationale and demand for the new dual degree, the structure and resource support for the new dual degree, guidelines for academic eligibility and meeting the School of Graduate Studies regulations, and any other supporting materials to assist with a thorough review of the request. A letter of support from the chair or director of each participating unit stating faculty support must also accompany the proposal.

### **Joint Degree Programs**

Joint degree programs are those from which a single degree is awarded by two or more institutions participating in a joint degree program. A joint degree will carry the name of each participating institution on a student's diploma.

The development of a joint degree program must follow respective institutional processes for the approval of new degree programs at each participating institution before being submitted to the UNC Board of Governors for approval. Information regarding UNC System policies on joint degrees may be found at: <http://intranet.northcarolina.edu/docs/legal/policymanual/400.1.1.pdf>. Joint degree programs are also subject to approval by SACS.

### **Accelerated Bachelors Masters Program**

The Accelerated Bachelor's/Master's (ABM) degree program allows an undergraduate student at North Carolina A&T State University an opportunity to complete the requirements for both the bachelor's and master's degrees at an accelerated pace. A student accepted into the ABM program will be permitted, as an undergraduate student, to take up to 12 credit hours of graduate courses that may also be used to satisfy requirements for his/her undergraduate degree. This will allow a student to complete a master's degree in the same field within approximately 18 months of completing the bachelor's degree.

#### Establishing an ABM Program

Prior to admission of any student into the ABM degree program, the program must be developed by the department/program and school/college and approved by the Graduate Council, the dean of the school/college offering the undergraduate program, the dean of the Graduate College, the Faculty Senate, and the Provost. The program may also require approval by SACS.

The same department or program that awards the bachelor's degree must sponsor the master's degree (ABM). This does not preclude a master's degree in interdisciplinary graduate programs in which the sponsoring department participates, nor acceptance of the student in a closely related field, if the department granting the graduate degree recommends admission to the Graduate College.



### Acceptance into the ABM Program

A student accepted into the ABM program has approval to pursue the ABM degree option. Acceptance is not a guarantee of admission into the Graduate College. Acceptance into the ABM program is contingent on meeting the following eligibility requirements:

- a. A student must have completed between 75 and 90 credit hours in his/her undergraduate program, including credit hours earned from advanced placement.
- b. A transfer student must have completed a minimum of two semesters (24 credit hours) as a full-time A&T student in addition to the 75 to 90 earned hours as stated above.
- c. A student must have a minimum cumulative Grade Point Average (GPA) of 3.25 on a 4 point scale.

### Application to the ABM Program

A prospective student who meets the eligibility requirements for the ABM program must set up a meeting with his/her undergraduate advisor and the graduate program coordinator to develop a Plan of Study for her/his bachelor's and master's degree programs. Before acceptance into an ABM program can be finalized, a student must submit:

- a. The standard application for admission to the Graduate College;
- b. A Plan of Study for the graduate degree that also indicates the graduation date for the master's degree. The Plan of Study must indicate the following: (i) a maximum of 12 graduate credit hours that will also count towards the undergraduate degree, (ii) a maximum of six (6) additional graduate credit hours that may be taken as an undergraduate student that will not be counted towards the bachelor's degree, (iii) courses that will be taken after matriculating into the graduate program, and (iv) the graduation date for the master's degree that meets the time limit for the ABM program (i.e. obtaining a thesis or non-thesis master's degree in the same field within 18 months of completing the bachelor's degree).
- c. Any changes to the ABM Plan of Study must be submitted in writing and approved by the chairperson and graduate program coordinator and by the dean of the Graduate College.

### Requirements for Participation and Graduation

A student must complete the bachelor's degree prior to being admitted to the master's program. A student in the ABM may not elect to by-pass the bachelor's degree.

### Continuing Eligibility

It is the responsibility of the student to recognize his/her eligibility status. To maintain continuing eligibility, a student must complete the bachelor's degree requirements with a GPA of at least 3.25 on a 4.0 scale, follow the plan of study, and meet other departmental requirements to continue to be eligible to participate in the program. If a student becomes ineligible to participate in the ABM degree program, the graduate program coordinator must inform the student in writing of his/her ineligibility. A copy of the letter to the student must be sent to the Graduate College.

### Withdrawal

A student may, at any time, withdraw from the ABM program by informing her/his undergraduate advisor and graduate program coordinator in writing. A copy of this request to withdraw must be sent to the Graduate College for approval.

A student who either withdraws or loses eligibility to continue in the program will not be able to use any graduate courses towards the bachelor's degree. However, a maximum of six credit hours of graduate courses may be used towards another master's degree with the approval of the graduate program coordinator, department chair, and the dean of the Graduate College.

## **Master's Degree Enroute to Doctoral Degree**

Graduate programs have the option of making their master's degrees available to students pursuing doctoral degrees in the same field without applying for admission to the master's programs provided the student continues to make satisfactory progress towards the doctoral degree.

A student admitted to a doctoral program may be awarded a master's degree in the same field as the doctoral program provided that all of the following conditions are satisfied:

- The student does not already have a master's degree in the same field.
- A Plan of Study for the doctoral program is approved by the student's advisor, department chair, and the Graduate School.
- The student makes normal academic progress toward the fulfillment of the doctoral degree requirements, consistent with the doctoral Plan of Study.
- A Plan of Study for the master's degree is submitted in the semester when the student expects to pass the doctoral preliminary exam and is approved by the student's advisor, the department chair, and the Graduate School. Only courses that are creditable towards the doctoral degree may be included in the master's Plan of Study.
- The student's advisor and department chair approves the awarding of the master's degree and the student submits an application to receive the master's degree.
- All Graduate School, academic School/College, and Department/Program requirements for the master's degree are satisfied.
- Unless previously approved by the Graduate School, the master's degree will be awarded after admission to candidacy.
- The maximum time limit for completion of the doctoral degree remains unchanged.

International doctoral students who are admitted to a PhD program and receive approval from the Graduate School to earn a master's degree enroute to the PhD must fulfill all requirements for the PhD in order to receive the master's degree. International students who decide to abandon the PhD program in favor of a master's degree program with the intention of applying for practical training in the field of the master's curriculum must apply for and be admitted to the new curriculum at the master's level at least one semester in advance of the intended change. International students must document the level change in writing from the Graduate School with the appropriate forms in order to be eligible for practical training in that field. Students in F-1 status who transfer to a new curriculum at the master's level must have a new Form I-20 issued prior to the transfer and should also understand that the PhD I-20 will remain as an "incompleted" program in the Student and Exchange Visitor Information System (SEVIS). The international doctoral graduate student must communicate his/her intentions to the Graduate Coordinator as well as to the Office of International Affairs and receive approval at least one full semester in advance of the change. Failure to do so could result in a violation of non-immigrant status and subsequent ineligibility for any type of employment.

## **Graduate Student Appeals**

Students may appeal the following decisions made by the academic programs or by the Graduate College.

### **Grade appeals**

The Graduate Appeals Committee considers grade appeals from graduate students. There are two grounds for appealing a grade: (1) evidence of miscalculation, and (2) material deviation from information published in the course syllabus without adequate notice of the change. The appeal should include three important aspects: (i) the action(s) being challenged, (ii) the person(s) against whom the complaint is being made—the “respondent,” and (iii) the redress being sought.

Before filing an appeal, a graduate student is expected to attempt to resolve the grading issue with the course professor and/or the department chairperson of the academic unit in which the grade was assigned. A graduate student who is unable to resolve issues with the course professor and/or department chairperson has thirty (30) calendar days from the date on which grades are due (as specified on the Registrar's academic calendar) for the relevant semester or summer session, or thirty (30) calendar days after the adverse decision at the department level to file an appeal with the dean of the Graduate College. If this date falls on a weekend or a university holiday, then the deadline will be the next workday. Students are responsible for submitting a written appeal with the required documentation to the dean of the Graduate College so that they are postmarked or hand-delivered by the deadline date. If a request for appeal is not postmarked or hand delivered by this deadline, it will not be considered.

### **Appealing dismissal from program**

A written appeal must be submitted to the dean of the Graduate College within thirty (30) calendar days following the adverse recommendation or decision. The appeal should include three important aspects: (i) the action(s) being challenged, (ii) the person(s) against whom the complaint is being made—the “respondent,” and (iii) the redress being sought. A decision shall be deemed final on the expiration of the period for filing an appeal, or if an appeal is filed, upon issuance of a decision in such an appeal, whichever is later.

One representative of the Graduate College, together with one representative from Student Affairs, shall examine the appeal and jointly determine whether the actions complained about were disciplinary or academic. If the challenged action is deemed to be disciplinary, the dean of the Graduate College shall refer the complaint to the appropriate university officers responsible for disciplinary matters within five (5) business days. If the challenged action is deemed to be an academic matter, the dean of the Graduate College shall forward the appeal to the Graduate Appeals Committee.

### **Graduate Appeals Committee**

The Graduate Appeals Committee will consist of two faculty members and a graduate student. One faculty member, from a college/school other than the one in which the student's academic department resides, will be appointed by the dean of the Graduate College. The other faculty member, from the college/school in which the student's program resides, will be appointed by the dean of the academic college/school. However, this representative will not be from the student appellant's department. In the event that either of the two aforementioned deans is a respondent against whom one or more allegations are pending in the appeal, the Provost will appoint the faculty member(s) for the affected dean. The Graduate Student Council will appoint a graduate student who is not a student in the appellant's college/school.

The Graduate Appeals Committee will review all written records of the case. As appropriate, it may afford the student appellant an opportunity to appear in person before it, and consider any written materials the student may wish to bring to its attention. The committee may also hear from the academic officer(s) whose action is being appealed and may confer with other involved parties. It shall evaluate any other information it deems important to its deliberations. The committee's report will be submitted to the dean of the Graduate College and the dean(s) of the appellant and the respondent(s). The dean of the Graduate College and the dean of the appellant's college/school shall jointly review the case, giving due consideration to the Graduate Appeals Committee's report and recommendation. The decision of the two deans will be final and do not set precedent; each case is considered on its own facts and merits.

In the event that one or both deans are respondents in the case, the Provost will appoint other dean(s) to officiate with respect to the appeal.

## **Graduate Faculty**

The Graduate Faculty of North Carolina Agricultural and Technical State University exists as part of the total University Faculty. The primary function of the Graduate Faculty of NCA&T is to provide educational and research experiences which support high quality graduate education and to provide advice concerning policies associated with graduate programs at the University.

### **Terminal Degree**

All faculty teaching graduate level courses must be members of the graduate faculty. Faculty members teaching courses at the master's and doctoral degree level are expected to hold the terminal degree in the discipline in which they are teaching or in a closely related discipline. In some cases, subject to prior approval by the SACS credentialing office, faculty members without a doctoral degree may teach graduate courses provided there is demonstrable evidence that such faculty member possess experience, knowledge, and capability in the discipline.

### **Appointment of Graduate Faculty**

Each school/college will establish specific criteria that delineate what constitutes an adequate record of sustained academic and scholarly activity for appointment. On the basis of the approved criteria, the school/college will develop a process of systematic review and evaluation that will lead to appointment as graduate faculty. Updates to the roster of graduate faculty for each graduate program will be communicated to the dean of the Graduate College at the start of each academic year.

### **Primary Criteria for Graduate Faculty**

- Evidence of regular and consistent creative or scholarly contributions that are widely disseminated in peer reviewed contexts in professionally recognized venues. Departments must define the expected level of scholarly contribution
- Supplemental appropriate professional activities including presentation at professional conferences, symposia and meetings, adjudication of scholarly and/or creative work for professional presentation, consulting, holding office in a professional society or organization germane to the discipline. Supplemental activities in lieu of documented record of scholarly and/or creative research will not qualify a faculty member for Full Graduate Faculty status.
- Actively involved in graduate education since last review. Department criteria must specify the minimum level of teaching activity necessary to maintain a regular appointment to Graduate Faculty, including demonstrated potential to direct masters or doctoral candidates successfully, number of students directed since the last review and their time-to-degrees, effective teaching of graduate courses appraised using class or peer evaluations, self-assessment by the faculty member, planning and directing of programs of graduate students and the direction of theses and dissertations, as well as serving on graduate student committees, and effectiveness and quality of mentoring. Initial appointments to the graduate faculty will not require this evidence of teaching performance, but evidence from previous institutions may be used in support of initial appointments if available.

Membership of the Graduate Faculty shall be divided into three categories: Full, Associate, and Affiliate Membership.

### **Full Members:**

Eligibility: Tenured or tenure-track faculty members at the academic rank of assistant professor or higher are eligible for full membership status. In addition, full graduate faculty will meet the criteria for appointment established by the academic college faculty and will be appointed to full membership through a process determined by the academic college.

**Responsibilities:** Full Members of the Graduate Faculty may participate in all aspects of the graduate program including teaching graduate level courses in their area of expertise, serving on thesis/dissertation committees, and chairing master's thesis and doctoral dissertation committees. Additionally, only Full Members are eligible for election to the Graduate Council, to serve as a Graduate Coordinator, to represent the Graduate College on thesis and dissertation defenses, and to vote on issues presented to the Graduate Faculty pertaining to changes to the graduate program.

### **Associate Members**

**Eligibility:** Tenured, tenure-track, and full-time non-tenure track faculty members and full-time EPA non-teaching employees are eligible for associate membership status. In addition, associate graduate faculty will meet the criteria for appointment established by the academic college faculty and will be appointed to associate membership through a process determined by the academic college.

**Responsibilities:** Associate Members of the Graduate Faculty may teach graduate courses, serve on thesis and dissertation committees, and co-chair master's thesis and doctoral dissertation committees provided a full graduate faculty member is the other co-chair.

### **Affiliate Members**

**Eligibility:** Tenured and tenure-track, full-time or part-time non-tenure track faculty members, full-time or part time EPA non-teaching employees, visiting, retired, clinical, extension, practicum, research, teaching, and contractual employees are eligible for affiliate membership status. In addition, affiliate graduate faculty will meet the criteria for appointment established by the academic college faculty and will be appointed to teaching membership through a process determined by the academic college.

**Responsibilities:** Affiliate Members of the Graduate Faculty may teach graduate courses and may serve as the third member on a thesis committee and fourth member on dissertation committee.

### **Review and Continuation of Graduate Faculty**

Each school/college will establish a process for continuation; change from Associate to Full member; or removal of membership on the Graduate Faculty. This process will be based on a variety of factors, including scholarly productivity, record of graduate teaching or mentorship, and/or other factors as defined by the school/college. The period of review will be defined by the school/college, but must occur at least once every five years.

A faculty member will automatically lose graduate faculty status at any time he/she is deemed deficient under post-tenure review.

### **Class Attendance**

The University is committed to the principle that regular and punctual class attendance is essential to the students' optimum scholastic achievement. An absence, excused or unexcused, does not relieve the student of any course requirement. **Attendance is required and punctuality is expected!** A student is responsible for all the work, including tests and written work, of all class meetings.

### **Instructor's Responsibility**

1. Attendance requirements should be stated in the course syllabus and announced in class, particularly at the beginning of each term. If class attendance is to affect a student's course grade, then a statement to that effect must be a part of the course syllabus distributed to each student.
2. Instructors will keep attendance records in all classes. Each instructor has the right to prescribe procedures as to how and when attendance will be taken.

### **Student's Responsibility**

It is the responsibility of each student to learn and comply with the requirements set by the instructor for each class in which he or she is registered. The student should:

1. have knowledge of each instructor's attendance and monitoring practices for class absences during the term,
2. become familiar with all materials covered in each course during absences and makeup work of any work required by the instructor, and
3. Initiate the request to make-up work on the first day of class attendance after the absence.

### **Make-Up of Required Course Work**

The administration, faculty and staff recognize that there are circumstances and events which require students to miss classes and any required course work which may be performed or due on the day of the absence. Also, they recognize that required course work is needed to give each student an adequate performance evaluation. Therefore, whenever reasonable (and more specifically described below), students should be allowed to make up required work.

The following definitions will apply with respect to this policy:

- a. Required course work – All work which will be used in the determination of final grades, e.g. examinations, announced quizzes, required papers and essays, required assignments.
- b. Instructor – Person responsible for the course and providing instruction and evaluation.
- c. Permissible reasons for requesting make up of required work – Sickness; death of relatives (immediate family); participation in approved University related activities; acting in the capacity of a representative of the University (band, choir, sports related travel, etc.); and extraordinary circumstances (court appearance, family emergency, etc.). NOTE: Other reasons for requesting make up of required course work are not acceptable.
- d. Documentation – Verification of sickness requires a signed statement of a physician or a duly authorized staff member of the Sebastian Health Center. Verification of death requires a signed statement from the Minister or Funeral Director. Verification of participation in University related activities requires a signed statement from the appropriate University official. Verification of other reasonable circumstances; for example, court appearance, family emergency, etc. requires a signed statement from an appropriate official (e.g., Court Official, parent or guardian, etc.).

The policy regarding make-up of required course work is as follows:

1. A student may petition an instructor to make up required course work whenever the student has a permissible reason for requesting make up of required course work.
2. A student will be required to present documentation which certifies absence constituting permissible reason.
3. Whenever possible, a student should consult with the instructor prior to an absence which will involve the failure to do required course work. Arrangements for make-up should be discussed and agreed upon at this time.
4. A student must petition for make-up of required course work on the first day that he or she returns to class.
5. If permission is granted to make up required course work, the instructor and the student should agree on an acceptable date for completion of missed required course work.
6. Failure to comply with item 4 may result in the denial to make up required course work.

Instructors should schedule make up work at a time that is convenient to both the instructor and the student.

## **Student Religious Observance**

The General Assembly of North Carolina enacted G.S. 116-11(3a), a law mandating the establishment of excused absences for religious observance by students.

1. The University allows up to two (2) excused absences per academic term for religious observances required by the faith of a student.
2. Instructors have the authority to specify, by posting on their course syllabi, the requirements that students must follow in requesting an excused absence for religious observances. These requirements may include, but are not limited to, providing written notice to the instructor, the amount of lead time required prior to the religious observance, the nature of the religious observance and confirmation of the student's participation in writing by an official of the religious organization. All requests for absences for religious observances and the supporting documentation must be maintained by the student's academic college/school.
3. When appropriate notice is provided by a student, the student must be granted up to two (2) excused absences per academic term under this policy and must be allowed to satisfy missed assignments, tests/exams, or other course work disseminated during the period of absence, including requirements to complete anticipated tests/exams or assignments in advance of the originally scheduled date. Beyond the terms and limits of this policy, instructors maintain authority to establish and enforce the attendance policy in their respective courses. The requirement for students to make such requests for excused absences applies only to days when the University is holding class

## **Add and Drop Period**

**Adding Courses:** Courses may be added during the first five (5) class days of a fall or spring semester. Courses may be added during the first two (2) class days of a summer session.

**Dropping Courses:** Courses may be dropped during the first five (5) class days of a fall or spring semester. Courses may be dropped during the first two (2) class days of a summer session.

Official student enrollment is represented by the number of hours in which a student is enrolled at the end of the fifth (5) day of classes in a fall or spring semester and at the end of the second (2) day of classes in a summer session. This date corresponds with the last day to drop courses and receive financial credit. Students wishing to drop all courses after this date must follow the University's withdrawal procedure.

All add/drop transactions must be completed by the official close of business on the last day to add/drop classes. If there are University-wide extenuating circumstances that prevent interaction with the web-based student information system, an extension of the add/drop deadline will be established

## **Withdrawal from an Individual Course**

A student may withdraw from any course or courses by submitting a Change of Schedule form to the Office of the Registrar on or before the last day to withdraw from an individual course, as published in the Academic Calendar.

Students who withdraw from a course or courses on or before the last day to withdraw from an individual course are assigned a grade of "W." Failure to attend class does not constitute a withdrawal from that course or courses. Students are limited to a maximum of one (1) withdrawal per course, up to a maximum of sixteen (16) credit hours over the student's academic career. Upon a second attempt in a single course, the student is not permitted to withdraw from the course and must receive a grade for the course.

A student who does not officially withdraw from a course or courses will be assigned final grade in each course in which he or she was enrolled during the semester in question. Withdrawing from a course or courses may affect a student's financial aid status, will count toward the tuition surcharge threshold, and may affect the student's progress toward degree completion.

Students considering withdrawing from a courses or courses should consult their faculty advisor or academic unit advisor and the Office of Student Financial Aid.

### **Withdrawal from the University**

Any student who is officially registered for classes and who wishes to withdraw from the University must complete the withdrawal process by the last day to withdraw from the university as published in the academic calendar.

Students who withdraw from the University prior to the published withdrawal deadline shall receive a "W" in all classes in which they were enrolled. Failure to attend classes does not constitute a withdrawal from the University. A student who does not officially withdraw from the University will be assigned the final grade earned in each course in which he or she was enrolled during the semester in question.

Withdrawal applications by students who have a pending judicial charge will not be processed by the Registrar. Pending judicial charges must be cleared before a student may officially withdraw from the University.

Withdrawal from the University may have significant academic and/or financial aid implications. Students are strongly encouraged to seek advisement by their academic advisor or academic unit and financial aid officer before completing the withdrawal process.

### **Retroactive Withdrawal from the University**

A student who was unable to initiate the process for withdrawal from the University by the last day to withdraw as published in the academic calendar may request a retroactive withdrawal. Requests for a retroactive withdrawal shall be considered on a case-by-case basis, and shall be based on the following:

- serious illness or documented medical condition;
- death of an immediate family member;
- involuntary call to active military duty;
- documented change in conditions of employment;
- newly documented learning disability;
- other emergency circumstances, legal requirements, or extraordinary situations.

Written requests must be submitted prior to the end of the semester immediately following the semester for which the retroactive withdrawal is being requested. Before Sebastian Health Center or the Counseling Services approves a retroactive withdrawal, the health care provider shall consult (with the student's consent and without providing medical details) with the school/college dean in the student's field of study for the dean's input.

Except under extraordinary circumstances or to comply with legal requirements, for retroactive withdrawals subsequent to the effective date of this policy, students are limited to one (1) retroactive withdrawal during their academic career.



## **Cancellation of Course Registration**

Under specific circumstances a student's course registration will be cancelled. The following are situations in which a student's course registration will be cancelled:

1. When the University cancels a course due to low enrollment or the unavailability of a qualified instructor,
2. When a student notifies the University, in writing, prior to the first day of classes that he/she will not be attending,
3. When a student fails to finalize payment of tuition and fees, after official notification to the student,
4. When a student is placed on academic suspension or on academic dismissal,
5. When a student is found to be ineligible to remain in the course due to not meeting the course prerequisite(s) or any course requirement(s),
6. When a student is found to be in violation of the Student Code of Conduct, prior to the first day of classes, and the Office of the Vice Chancellor for Student Affairs requests that the registration be cancelled.

## **Student Immunization Requirement**

To protect the general health of the University community, the General Assembly of North Carolina enacted G.S. 130A-155.1, a law mandating that students submit proof of receiving required immunizations. Students who fail to submit proof of immunization, by the published deadline, will not be allowed to register for courses or they will have their course registration cancelled.

## **Payment of Tuition, Fees and other Dues**

Students are officially enrolled at North Carolina A & T State University when all tuition, housing, meals and other applicable charges and fees have been paid in full. Students are responsible for full payment of tuition, fees and all other debts to the University by the published due date for the term. Failure to pay tuition, fees and all other debts will result in cancellation of the student's schedule/courses.

Students who add courses during the drop/add period, that result in additional tuition charges, are required to pay all charges and fees by the published due date. If the student fails to pay the additional charges, registration for the additional course(s) will be cancelled. Students who drop courses during the drop/add period, that result in a reduction in the tuition amount previously paid, will receive a refund if the transaction is made prior to the last day to drop and receive financial credit. It is the responsibility of the student to periodically check their student account for additional charges. It is also the student's responsibility to immediately respond to all bills and email notification of balances due the university.

## **Privacy of Student Records**

The University ensures students access to their official academic records but prohibits the release of personally identifiable information, other than "directory information," from these records without their permission, except as specified by public law 93-380. "Directory information" includes: Student's name, address, E-mail address, telephone number, date and place of birth, school, major, dates of attendance, degree(s) received, honors received, institution(s) attended prior to admission to North Carolina Agricultural and Technical State University, past and present participation in officially recognized sports and activities, and physical factors. Public Law 93-380 further provides that any student may, upon written request, restrict the printing of such personal information relating to himself or herself as is usually included in campus directories. A student who desires to have "directory information" withheld must submit a written request to the Office of the Registrar prior to the end of the add/drop period for the semester in which he or she is enrolled.

### **Access to Student Records**

1. The policy for the administration of student academic records is in accordance with the Family Educational Rights and Privacy Act of 1974 as amended.
2. Students have the right to inspect and review any and all official records, files, and data directly related to them.
3. A student who believes that his or her record contains inaccurate or misleading information shall have an opportunity for a hearing to challenge the content of the record, to assure that the record is not inaccurate, misleading, or otherwise in violation of his or her privacy or rights, and to provide an opportunity for the correction or deletion of any such inaccurate, misleading, or otherwise inappropriate data contained therein or include the student's own statement of explanation.
4. The University will comply with requests for records within a reasonable period of time and not later than (30) days after the request is received.
5. The release of academic records requires the written permission of the student, except as provided by Public Law 93-380. Transcripts are not issued to a student who has not met his or her financial obligations to the University.

### **Change of Name and Address**

It is the obligation of every student to notify the Office of the Registrar of any change in name or address. Failure to do so can result in a delay in the handling of the student's records and in sending official University notifications to the student's home. To change a name a student must first have a legal court document.

### **Transcripts of Records**

Students needing an official transcript should submit a completed Transcript Request Form to the Office of the Registrar at least one week before the official transcript is needed. Transcript requests are not processed for any student or alumnus with an obligation to the University such as unpaid fees, overdue loans, library books, audiovisual equipment, or whose admission records are not complete. The completed transcript request should contain the student's name (at the time they attended), student identification number, date of birth, the name and address of where the transcript is to be sent, and the student's signature. Unofficial transcripts may be obtained via Aggie Access On-Line (<https://horus.ncat.edu:9096>).

### **Academic Dishonesty Policy**

North Carolina Agricultural and Technical State University is committed to a policy of academic honesty for all students. Examples of Academic Dishonesty include but are not limited to:

- Cheating or knowingly assisting another student in committing an act of academic dishonesty;
- Plagiarism (unauthorized use of another person's words or ideas as one's own) which includes but is not limited to submitting examinations, theses, reports, drawings, laboratory notes or other materials as one's own work when such work has been prepared by another person or copied from another person.
- Unauthorized possession of examinations or reserve library materials, destruction or hiding of source materials, library materials, or laboratory materials or experiments or any other similar action;
- Unauthorized changing of grades or marking on an examination or in an instructor's grade book, or such change of any grade record;
- Aiding or abetting in the infraction of any of the provisions anticipated under the general standards of student conduct; or
- Assisting another student in violating any of the above rules.

A student who has committed an act of academic dishonesty has failed to meet a basic requirement of satisfactory academic performance. Thus, academic dishonesty is not only a basis for disciplinary action but may also affect the evaluation of the student's level of performance. Any student who commits an act of academic dishonesty is subject to disciplinary action as defined below.

In instances where a student has clearly been identified as having committed an academic act of dishonesty, the instructor may take appropriate punitive action including a loss of credit for an assignment, an examination or project, or award a grade of "F" for the course subject to the review and endorsement of the chairperson and the dean. Repeated offenses can even lead to dismissal from the University.

### **Student Appeal**

A student who feels unfairly treated as a result of an academic dishonesty matter may appeal the action in writing to the University Judicial Tribunal. The written notice of appeal must be submitted within one week (seven calendar days) of the date of the incident. The student should refer to the section on Appellate Procedures in the Student Handbook.

### **Disruptive Behavior in the Classroom**

*(UNC-GA Policies for Students-Adopted by BOG October 26, 1970)*

The instructor may withdraw a student from a course for behavior he deems to be disruptive to the class. The grade assigned will be "W" if the behavior occurs before the deadline for dropping a course without academic penalty, and the instructor has the option of giving a "W" or a "F" if the behavior occurs after the deadline.

### **Binding Procedures for Instructors**

The instructor must provide an opportunity for the student to be heard. In providing this opportunity, the instructor must follow the procedure described below:

1. The student should be notified in writing at the next class attended that the instructor proposes to drop the student from the course for disruption of the class, and the instructor should provide the student with written instructions regarding the time and place for a meeting with the instructor. A copy of this written notification must be sent to the instructor's department head at the same time.
2. A time limit of five working days (M-F) from the time written notification is given for the student's opportunity to be heard by the instructor.
3. The date of notification establishes whether the withdrawn student will be given a "W" or "F." "W" is appropriate before the 8-week drop date and either "W" or "F" is appropriate after that date, at the instructor's discretion.
4. The instructor may suspend the student from class until the instructor takes final action to withdraw the student from class or to allow the student to continue in the class. The final decision to withdraw or continue the student is the instructor's.
5. Either party in the resolution of this dispute may invite one other person of the university community to be present as an observer.

### **Student's Right to Appeal**

If the student wishes to appeal the instructor's decision to withdraw the student from class, he/she should follow the academic appeal procedures.

### **Cell Phone Policy**

The use of cell phones inside the classroom during the classroom period is prohibited. Please be advised that placing or receiving calls as well as conversing on cell phones during the conduct of a class shall be considered as disruptive behavior for students and unprofessional behavior for faculty and staff.

## Curriculum Requirements

### Accountancy, MAcc

College of Business and Economics

**Graduate Coordinator:** Kecia Williams Smith **Email:** kwsmith3@ncat.edu **Phone:**  
**Department Chair:** Gwen Highsmith-Quick **Email:** highsmig@ncat.edu **Phone:** (336) 285-3364

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The Master of Accountancy program consists of 30 credit hours and serves the primary purpose of preparing students for careers as professionally certified accountants. The primary target for the MAcc will be students who have completed an undergraduate degree in accounting from an accredited business school. Students who have completed an undergraduate degree program in another discipline will require prerequisite courses as needed to ensure foundational knowledge in accounting and business.

#### **Additional Admission Requirements:**

- GMAT or GRE exam score if undergraduate GPA is less 3.30 (non-accounting) or 3.00 (accounting)
- Resume

#### **Program Outcomes:**

- Students completing the program will meet all educational requirements for licensing as a Certified Public Accountant as well as other major certifications, including the Certified Management Accountant and the Certified Fraud Examiner certifications.

#### **Degree Requirements**

Total credit hours: 30

- Core courses (24 credits): ACCT 689, 743, 744, 761, 763, 774, 781, 792, 795 and FIN 750
- Electives: MGMT 725 or 715 and 3 credits from any one of ECON, MGMT, or MKTG
- Students without a business background must take ACCT 331, 332, 362, 443, 461; and MGMT 429

## Adult Education, MS

College of Education

**Graduate Coordinator:** Sonya Drapers

**Email:** drapers@ncat.edu

**Phone:** (336) 285-4385

**Department Chair:** Bernadine Chapman

**Email:** chapmanb@ncat.edu

**Phone:** (336) 285-2141

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The Adult Education program is designed to prepare effective adult educators who will become change agents within local and international communities. Curricular experiences emphasize the historical, philosophical, and socio-cultural foundations of adult education with a special focus on the Black Diaspora. Graduates are prepared to work as community activists, agency supervisors/directors, program planners, program facilitators/planners, community leaders/organizers, directors of professional organizations, media organizers, and many other community roles. The Adult Education program follows the professional standards devised by the Commission of Professors of Adult Education.

### **Additional Admission Requirements:**

- Professional portfolio
- Written sample

### **Program Outcomes:**

- **Measurement and Evaluation:** Develop and apply standards for evaluating projects, programs and educational research.
- **Program Development:** Assess design, deliver, and evaluate adult education and training programs.
- **Application:** Apply adult learning and development theories to increase adult performance at the individual, group, and/or organizational levels.
- **Adult Program Processes:** Facilitate the understanding of adult education program processes—planning, organizing, leading, implementing, budgeting, and evaluating.
- **Communication:** Demonstrate effective written and oral communication skills.

### **Degree Requirements**

Total credit hours: 30

- Core courses (12 credits): ADED 707, 708, 709, 716

#### Thesis option:

- Take 3 credits: ADED 794
- Take 9 credits from: ADED 600-799 with approval of advisor
- Thesis (ADED 797: 6 credits)
- Pass thesis defense

#### Non-Thesis Option:

- Take 15 credits from: ADED 600-799 with approval of advisor
- Practicum (ADED 784: 3 credits)
- Pass comprehensive exam

## Agricultural and Environmental Systems - Agribusiness & Food Industry Management, MS

College of Agriculture & Environmental Science

**Graduate Coordinator:** Godfrey Ejimakor      **Email:** ejimakor@ncat.edu      **Phone:** 336-285 -4829

**Department Chair:** Kenrett Jefferson-Moore      **Email:** jykenret@ncat.edu      **Phone:** 336-285-4827

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The Master of Science in Agricultural and Environmental Systems - Agribusiness and Food Industry Management focuses on business applications that support the food and fiber industry. The overall mission of the program is to prepare students for successful post-baccalaureate work by developing and maintaining a program in partnership with industry that is the focal point of state agribusiness which includes the food, fiber and animal sub-sectors in North Carolina as well as the United States.

### **Program Outcomes:**

- The program will give students the skill set, including analytic and communication (both written and oral), to manage an agribusiness enterprise.
- The program will give the students the decision-making skills, including decision-making under risk and uncertainty.
- The program will give students the ability to understand applied economics, including transaction costs analysis and game theory.
- The program will give students the ability to understand the functions of management, including business strategy, marketing, finance, operations/logistics, and human resource management.
- The program will give students an appreciation for contemporary issues facing food and agribusiness managers.
- The program will enhance students' ability to be comfortable with networking (i.e. building social capital).

### **Degree Requirements**

Total credit hours: 30

- Core courses (9 credit hours): AGRI 604/ABM 705, AGRI 700, 780

#### Thesis option

- Select 15 credit hours from ABM courses with approval of advisor
- Thesis (ABM 797: 6 credits)
- Pass thesis defense

#### Project option

- Select 18 credit hours from ABM courses with approval of advisor
- Project (ABM 796: 3 credits)

## Agricultural and Environmental Systems - Integrated Animal Health Systems, MS

College of Agriculture & Environmental Science

**Graduate Coordinator:** Radiah Minor

**Email:** rcminor@ncat.edu

**Phone:** 336-285-4816

**Department Chair:** Tracy Hanner

**Email:** hanner@ncat.edu

**Phone:** 336-285-7720

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The Master of Science in Agricultural and Environmental Systems - Integrated Animal Health Sciences is designed to provide a solid foundation of fundamental biological and biochemical principles within the areas of biotechnology, breeding and genetics, microbiology, nutrition, physiology and toxicology. Thesis research or a project is conducted in the laboratories of faculty research advisors in the areas of biotechnology, immunology, microbiology, nutrition and physiology in poultry and livestock production (swine, goat, sheep, dairy and beef cattle) for sustainable agricultural and environmental systems.

### **Additional Admission Requirements**

- Baccalaureate degree in animal science, agriculture or other related STEM area. Unconditional admission requires an undergraduate degree in animal sciences or a closely related discipline that includes work with lab or farm animals

### **Program Outcomes:**

- To develop abilities to assess and conduct valid scientific research and practices that will facilitate sustainable food production
- To develop understanding of agricultural and environmental systems and interdisciplinary approaches for improved animal health, management and well being

### **Degree Requirements**

- Core courses (9 credit hours): AGRI 604/ABM 705, AGRI 700, 780

#### Thesis option

- Select 15 credit hours from ANSC courses with approval of advisor
- Thesis (ANSC 797: 6 credits)
- Pass thesis defense

#### Project option

- Select 15 credit hours from ANSC courses with approval of advisor
- Select 3 credit hours from any discipline with approval of advisor
- Project (ANSC 796: 3 credits)



## Agricultural and Environmental Systems - Natural Resources and Environmental Systems, MS

College of Agriculture & Environmental Science

**Graduate Coordinator:** Louis Jackai

**Email:** lejackai@ncat.edu

**Phone:** 336- 285- 4837

**Department Chair:** Abolghasem Shahbazi

**Email:** ash@ncat.edu

**Phone:** 336- 285- 4851

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The Master of Science in Agricultural and Environmental Systems – Natural Resources and Environmental Systems prepares students for career opportunities and research in the natural environmental and natural resources.

### **Additional Admission Requirements**

- Academic preparation in basic sciences

### **Program Outcomes:**

- The production of advanced agricultural scholars that obtain professional and leadership roles with agricultural and environmental related entities
- Individuals that pursue doctoral studies and the valuable scholarly works produced by graduates of the program, through thesis and capstone project endeavors.

### **Degree Requirements**

Total credit hours: 30

- Core courses (9 credit hours): AGRI 604/ABM 705, AGRI 700, 780

#### Thesis option

- Select 15 credit hours from: NARS; AGRI; HORT; SLSC; EASC with approval of advisor
- Thesis (NARS 797: 6 credits)
- Pass thesis defense

#### Project option

- Select 18 credit hours from: NARS; AGRI; HORT; SLSC; EASC with approval of advisor
- Project (NARS 796: 3 credits)

## Agricultural Education – Professional Licensure, MS

College of Agriculture & Environmental Science

**Graduate Coordinator:** Chastity Warren English **Email:** ckwarren@ncat.edu **Phone:** 336-285-4819

**Department Chair:** Anthony Yeboah **Email:** yeboaha@ncat.edu **Phone:** 336-334-7943

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The Master of Science in Agricultural Education prepares students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber, and natural resources systems. Agricultural Education at North Carolina A&T is offered completely online and on campus. The Professional Licensure concentration prepares individuals to teach agriscience education in middle and high schools. Graduates of this track are eligible to apply for advanced (graduate level) licensure in North Carolina. This track offers graduates versatility in career options, because it also prepares them for the many other professions that rely on agricultural educators. The Agricultural Education program is accredited by the National Council for Accreditation of Teacher Education (NCATE) and the North Carolina Department of Public Instruction to offer advanced licensure training in Agricultural Education.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability to register for certain required courses. Applicants and current students should review licensure requirements at <http://www.ncat.edu/academics/schools-colleges1/soe/teacher-education/index.html> or visit the College of Education for guidance on specific requirements.

### Additional Admission Requirements

- Basic preparation in an agricultural related discipline or other broadly related areas.
- The Professional Licensure track is designed for individuals who are currently teaching secondary agricultural education, holders of the "A" License for secondary agricultural education in the State of North Carolina, are provisionally licensed for agricultural education, or are seeking licensure through the graduate program.

### Program Outcomes:

Upon completion of the graduate program in Agricultural Education:

- Students will critically analyze issues impacting the food, agricultural, and environmental science.
- Students will demonstrate the ability to effectively communicate knowledge and issues impacting the food, agricultural, and environmental science disciplines.
- Students will develop and implement effective program planning and evaluation plans for their agricultural education programs to facilitate improvement of agricultural education programs.
- Demonstrate a deeper appreciation and knowledge of the agricultural education discipline.
- Students will be able to implement and use a variety of instructional methodologies and technologies.
- Students will be prepared to teach a diverse population about subject matter related to food, agricultural, and environmental sciences.

### Degree Requirements

Total credit hours: 30

- Core courses (12 credit hours): AGED 703, 704, 710, 711

#### Thesis option

- Take AGED 752
- Select 9 credits from School of Agriculture or Curriculum and Instruction with approval of advisor

- Thesis (AGER 797: 6 credits)
- Pass thesis defense

Project option

- Take AGED 752
- Select 12 credits from School of Agriculture or Curriculum and Instruction with approval of advisor
- Project (AGED 796: 3 credits)

## Agricultural Education – Professional Service, MS

College of Agriculture & Environmental Science

**Graduate Coordinator:** Chastity Warren English **Email:** ckwarren@ncat.edu **Phone:** 336-285-4819

**Department Chair:** Anthony Yeboah **Email:** yeboaha@ncat.edu **Phone:** 336-334-7943

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The Master of Science in Agricultural Education prepares students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber, and natural resources systems. Agricultural Education at North Carolina A&T is offered completely online and on campus. The Professional Service concentration prepares individuals for careers in agribusiness, government, or legal professions. Students interested in international study can participate in the Peace Corps International. Students in both study tracks are also prepared for doctoral degree programs and other professional schools. Graduates of the program find employment in secondary education, agribusiness industry, federal and state government, cooperative extension, higher education, rural and international development, and nonprofits. Some prominent employers include the United States Department of Agriculture, John Deere, Kraft, Cargill, and the North Carolina Public School System. Many graduates go on to pursue doctoral work at prestigious research universities such as Iowa State, The Ohio State, Purdue, Penn State, and Virginia Tech.

### Additional Admission Requirements

- Basic preparation in an agricultural related discipline or other broadly related areas.

### Program Outcomes:

Upon completion of the graduate program in Agricultural Education:

- Students will critically analyze issues impacting the food, agricultural, and environmental science.
- Students will demonstrate the ability to effectively communicate knowledge and issues impacting the food, agricultural, and environmental science disciplines.
- Students will develop and implement effective program planning and evaluation plans for their agricultural education programs to facilitate improvement of agricultural education programs.
- Demonstrate a deeper appreciation and knowledge of the agricultural education discipline.
- Students will be able to implement and use a variety of instructional methodologies and technologies.
- Students will be prepared to teach a diverse population about subject matter related to food, agricultural, and environmental sciences.

### Degree Requirements

Total credit hours: 30

- Core courses (12 credit hours): AGED 703, 704, 710, 711

#### Thesis option

- Take AGED 712
- Select 9 credits from School of Agriculture or Curriculum and Instruction with approval of advisor
- Thesis (AGER 797: 6 credits)
- Pass thesis defense

#### Project option

- Take AGED 712
- Select 12 credits from School of Agriculture or Curriculum and Instruction with approval of advisor
- Project (AGED 796: 3 credits)

## Applied Mathematics, MS

College of Science and Technology

**Graduate Coordinator:** Alexandra Kurepa

**Email:** kurepa@ncat.edu Phone: 336-285-2079

**Department Chair:** Guoqing Tang

**Email:** tang@ncat.edu Phone: 336-285-2033

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The Applied Mathematics program provides a thorough background and research training in one of the key areas of Applied Mathematics, such as Mathematical Modeling and Analysis, Dynamics Systems and Differential Equations, Numerical Analysis and Fluid Dynamics, Probability and Statistics, Control Theory and Optimizations. The program also gives the students hands-on experience in current important applications in these areas, along with the statistical and computational skills to apply their knowledge to real world applications.

### **Additional Admission Requirements**

A Bachelor's degree in Mathematics or a closed related field from an accredited institution

### **Program Outcomes:**

- Students will develop research expertise in one of the areas of Applied Mathematics.
- Students will proficiently apply mathematical knowledge, technology skills, and logical reasoning and proof skills, in solving problems or developing new techniques in Applied Mathematics.
- Students will communicate effectively and with confidence using accurate symbolic representation and correct mathematical terminology orally, in writing, and when using technology according to the standards of the field of mathematics.
- Students will develop the ability to use mathematical reasoning and analysis to acquire a comprehensive understanding of Applied Mathematics. Students will be able to apply analytical reasoning skills in decision making as well as mathematics based problem solving skills in an interdisciplinary context.
- Students will demonstrate computational skills and knowledge of current technology, software and hardware used in Applied Mathematics.

### **Degree Requirements**

Total credit hours: 30

- Core courses (9 credit hours): MATH 603, 651, and 690

#### Thesis option:

- Take 9 credit hours of 700 level MATH courses with approval of advisor
- Take 6 credit hours of graduate electives with approval of advisor
- Master's Thesis (MATH 797: 6 credit hours)
- Pass Master's Comprehensive Exam
- Pass thesis defense

#### Project Option:

- Take 9 credit hours of 700 level MATH courses with approval of advisor
- Take 9 credit hours of graduate electives with at least 3 credit hours at 700 level and approval of advisor
- Graduate Design Project (MATH 796: 3 credit hours)
- Pass Master's Comprehensive Exam
- Pass Graduate Design Project oral examination

## Applied Science and Technology, PhD

College of Science and Technology

**Graduate Coordinator:** Keith Schimmel

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**Phone:** 336-285-2329

**Department Chair:** Keith Schimmel

**Email:** schimmel@ncat.edu

**Phone:** 336-285-2329

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The mission of the Applied Science & Technology PhD program is to prepare students for high-level science and technology careers in industry, research, and government. Graduates will be able to conceive, develop, and conduct original research that applies physical, mathematical, and technological methods to provide solutions to a broad range of emerging local, national, and global problems related to physical and life sciences, energy and environment, and technology.

### Additional Admission Requirements

- B.S. degree in a science, math, technology, engineering or related discipline with a GPA  $\geq 3.5/4.0$  or a master's degree in a science, math, technology, engineering or related discipline with a GPA  $\geq 3.25/4.0$  from a college or university recognized by a regional or general accrediting agency
- GRE or GMAT verbal and quantitative scores

### Program Outcomes:

- **Communication Skills** – (1) Students completing the Applied Science & Technology PhD program will exhibit effective oral communication skills in terms of customizing presentations to the audience, displaying information, and delivering the presentations. (2) Students completing the Applied Science & Technology PhD program will exhibit effective written communication skills in terms of content/ideas, organization, word choice, and grammar.
- **Critical Thinking Skills** - Students completing the Applied Science & Technology PhD program will effectively use quantitative and qualitative analytical problem - solving skills in terms of defining hypotheses/research questions, reviewing research literature, developing a research plan, identifying the broader impacts of research, and developing a research timetable.
- **Disciplinary Expertise** - Students completing the Applied Science & Technology PhD program will demonstrate discipline - specific expertise in terms of the scientific method, applying technical knowledge to answer research questions, experimental plans and data analysis, analytical methods, and research ethics.
- **Research/Creative Engagement** - Students completing the Applied Science & Technology PhD program will demonstrate ability to engage productively in the review and conduct of disciplinary research in terms of making conference presentations and publishing refereed journal publications.

### Degree Requirements

Total credit hours: 66 (post B.S.), 42 (post M.S.)

- **Core courses (9 credits):** AST 830 (Foundations of Scientific Research), AST 831 (Math and Computational Modeling), MATH 721 (Multivariate Statistical Analysis)
- **Seminar (6 credits post B.S., 3 credits post M.S.):** Take AST 992 six times in six semesters
- **Dissertation (AST 997: 15 credits)**
- **Pass qualifying exam, preliminary exam, and dissertation defense**
- **In consultation with advisor, take 18 credit hours (15 post M.S.) within one of the following concentrations**
  - Atmospheric, Environmental and Energy Science
  - Applied Physics
  - Bioscience
  - Applied Chemistry
  - Data Science and Analytics
  - Information Technology and Technology Management

- General – no specified concentration
- In consultation with advisor, take 18 credit hours (post B.S.) of additional courses relevant to research area

**Dissertation Research:**

A student may not register for dissertation credits before passing Qualifying Examination. No more than 15 dissertation credits are counted toward the total credit hours requirement for the degree.

**Qualifying Examination:**

The Qualifying Examination is given to assess the student's competence in a broad range of relevant subject areas. Only students with unconditional status and in good academic standing may take the Qualifying Examination. A student who wants to retake the Qualifying Examination must apply to retake the Qualifying Examination by the posted deadline. No student is permitted to take the Qualifying Examination more than twice. A student not recommended for re-examination or who fails the exam on a second attempt may be dismissed from the doctoral program.

**Preliminary Oral Examination:**

The Preliminary Oral Examination is conducted by the student's dissertation committee and is a defense of the student's dissertation proposal. Passing this exam satisfies requirements for Ph.D. Candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Admission to Candidacy**

Student will be admitted to candidacy upon successful completion of the Qualifying Exam and the Preliminary oral Exam.

**Final Oral Examination:**

The Final Oral Examination is conducted by the student's dissertation committee. This examination is the final dissertation defense presentation that is scheduled after a dissertation is completed. The examination may be held no earlier than one semester (or four months) after admission to candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Submission of Dissertation:**

Upon passing the Ph.D. Final Oral Examination, the Ph.D. student must have the dissertation approved by each member of the student's dissertation committee. The approved dissertation must be submitted to The Graduate College by the deadline given in the academic calendar, and must conform to the Graduate College's guidelines for theses and dissertations.

## Bioengineering, MS

College of Engineering

**Graduate Coordinator:** Yeohung Yun

**Email:** yyun@ncat.edu

**Phone:** 336-285-3226

**Department Chair:** Stephen B. Knisley

**Email:** sbknisle@ncat.edu

**Phone:** 336-334-7564

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The Master of Science in Bioengineering program prepares graduates for Ph.D. level studies or for advanced bioengineering practice in industry, consulting, or government service. The program emphasizes advanced research and education in the application of engineering principles, methods, and technologies to problems in health care. The Bio Engineering Masters students and faculty conduct research in a variety of medical and life science areas such as biosystems analysis, implantable medical devices, artificial organs, tissue engineering, biomaterials, biomechanics, biosignals and biosensors.

### Additional Admission Requirements

- Unconditional admission requires undergraduate degree from an ABET accredited Engineering program

### Program Outcomes:

- The graduates will perform effectively in an advanced bioengineering (biomedical) related position in industry or in advance graduate/professional schools.
- The graduates will demonstrate research leadership skills in using interdisciplinary and advance approaches or techniques for solving their research or project problems in the bioengineering field.
- The graduates will be active in leadership positions of the professional societies.
- The graduates will enhance their professional credentials through conference presentations, publications and understanding the importance of lifelong learning.
- Be prepared to join the workforce and contribute to economic development.

### Degree Requirements

Total credit hours: 30

- Core courses (9 credits): BMEN 711, 712, 713

#### Thesis option:

- Engineering electives: Take 9 credits from BMEN; CHEN; CIEN; ECEN; ISEN; MEEN; NANO; CSE; COMP with approval of advisor
- Life Sciences electives: Select 6 credit hours from BIOL; ANSC with approval of advisor
- Participate in BMEN Seminar
- Thesis (BMEN 797: 6 credits)
- Pass thesis defense

#### Project Option:

- Engineering electives: Take 12 credits from BMEN; CHEN; CIEN; ECEN; INEN; MEEN; NANO; CSE; COMP with approval of advisor
- Life Sciences electives: Select 6 credit hours from BIOL; ANSC with approval of advisor
- Participate in BMEN Seminar
- Project (BMEN 796: 3 credits)

#### Course Option:

- Engineering electives: Take 15 credits from BMEN; CHEN; CIEN; ECEN; INEN; MEEN; NANO; CSE; COMP with approval of advisor
- Life Sciences electives: Select 6 credit hours from BIOL; ANSC with approval of advisor
- Participate in BMEN Seminar



## Biology, MS

College of Science and Technology

**Graduate Coordinator:** Scott Harrison

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**Phone:** 336-285-2179

**Department Chair:** Mary A. Smith

**Email:** smithma@ncat.edu

**Phone:** 336-285-2160

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The primary objective of the Masters of Science program in Biology is to prepare students to enter and complete doctoral and health professional programs in order to become productive teachers, researchers, and health professionals. To support this objective, this program will develop in all participants, through research experiences and other enrichment activities, independent thinking, creativity, critical judgment, and personal integrity. Specifically, this program is designed to enhance the student's ability to design experiments, to analyze results, to become competent using state-of-the-art research equipment, enhance manipulative skills, and to improve the student's proficiency in oral and written communication. Students will have opportunity to conduct research in various areas, including cancer research, diabetes research, molecular genetics, microbiology/immunology, genomics/bioinformatics, physiology, evolution, toxicology, and health disparities research. An additional critical objective is to enable students to score at or above the 50th percentile on the GRE Subject Test in Biology after their first year in residency.

### Additional Admission Requirements

- A Bachelor's Degree in Biology or a related discipline from an accredited institution.
- Chemistry through Organic II
- One year of Calculus, One year of Physics and Cellular and Molecular Biology

### Program Outcomes

- SLO 1: Knowledge of the Biological Discipline. During the course of study in the Master of Science Degree Program in Biology, students integrate biological concepts from a variety of sub-disciplines on the required comprehensive examination prepared by instructors of courses that students have taken in the first year.
- SLO 2: Communication. During the course of study in the Master of Science Degree Program in Biology, students will present research findings in standard formats used by biological scientists and the guidelines of the NC A&T Graduate College.
- SLO 3: Critical Thinking (Masters Level). During the course of study in the Master of Science Degree Program in Biology, students will conduct critical reviews of scientific papers according to guidelines of the instructor.
- SLO 4: Scientific Research. During the course of study in the Master of Science Degree Program in Biology, students will implement an original research project based on the standard guidelines for biological research and a proposal approved by a faculty research advisor and committee.

### Degree Requirements

Total credit hours: 30

- Core courses (9 credits): BIOL 749, 761; CHEM 651

#### Thesis option:

- Take 3 credit hours: BIOL 703
- Electives: Select 4 credit hours from BIOL, ANSC, CSE or other with approval of graduate program coordinator
- Seminar (2 credit hours): BIOL 789, 792
- Supervised Research (BIOL 794: 6 credits)
- Thesis (BIOL 797: 6 credit hours)
- Pass thesis defense
- Pass comprehensive exam

Project Option:

- Take 3 credit hours: BIOL 703
- Electives: Select 10 credit hours from BIOL, ANSC, CSE or other with approval of graduate program coordinator
- Seminar (2 credit hours): BIOL 789, 792
- Project (BIOL 796: 6 credit hours)
- Pass comprehensive exam

## Biology – Industrial Biosciences PSM, MS

College of Science and Technology

**Graduate Coordinator:** Scott Harrison

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**Phone:** 336-285-2179

**Department Chair:** Mary A. Smith

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**Phone:** 336-285-2160

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The primary objective of the Professional Science Master's concentration in Industrial Biosciences is to provide students with advanced technical skills, industry-guided knowledge, and business training to prepare them for work in the commercial sector. To support this objective, this program will develop in all participants, through training experiences and other enrichment activities, scientific understanding, understanding of the commercialization process, critical judgment, and personal integrity. Specifically, this program is designed to enhance the student's ability to manage scientific projects, to understand regulatory, ethical and legal dimensions of science-based work, to become competent using state-of-the-art research equipment, and to improve the student's proficiency in oral and written communication. Students will have opportunity to pursue training in various project areas, including genetics, microbiology, biotechnology, bioinformatics, physiology, evolution, toxicology, and health disparities research.

### Additional Admission Requirements

- A Bachelor's Degree in Biology or a related discipline from an accredited institution.
- Chemistry through Organic II
- One year of Calculus, One year of Physics and Cellular and Molecular Biology

### Program Outcomes

- **Communication skills:** Students completing the MS degree program in Biology will exhibit effective communication skills (written, oral, graphic and interpersonal) appropriate for professionals in this field of study at the master's or doctoral level
- **Critical Thinking skills:** Students completing the MS degree program in Biology will effectively use quantitative and/or qualitative analytical problem-solving skills appropriate for professionals in this field of study at the master's or doctoral level
- **Disciplinary Expertise:** Students completing the MS degree program in Biology will demonstrate a level of discipline-specific expertise (knowledge, skills, and professionalism) appropriate for professionals in this field of study at the master's or doctoral level
- **Research/Creative Engagement:** Students completing the MS degree program in Biology will demonstrate ability to engage productively in the review and conduct of disciplinary research and creative professional activity appropriate for professionals in this field of study at the master's or doctoral level

### Degree Requirements

Total credit hours: 30

- **Core courses (9 credits):** BIOL 749, 761; CHEM 651
- **Disciplinary Electives:** Select 6 credit hours from BIOL with approval of PSM coordinator
- **Business/Management Electives:** Select 6 credit hours from graduate courses in business and economics with approval of advisor
- **Ethics Electives:** Select 3 credit hours from: MKTG 636; WMI 617, or other course with approval of advisor
- **Experiential component:** Project (BIOL 796: 6 credit hours)

## Business Administration - Accounting, MBA

College of Business and Economics

**Graduate Coordinator:** Eric Gladney      **Email:** emgladne@ncat.edu      **Phone:** 336-285-3774

**Department Chair:** Gwen Highsmith-Quick      **Email:** highsmig@ncat.edu      **Phone:** 336-285-3364

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The Master of Business Administration program with a concentration in Accounting prepares students for professional careers in accounting and management positions in the public or private sectors. This high quality program will provide accounting graduates from A&T and other institutions the opportunity to enhance their marketability through professional certification. This program has been designed to be competitive with graduate accounting programs at peer and competitive institutions. The MBA program is accredited by the AACSB International - The Association to Advance Collegiate Schools of Business International. This is the premier accrediting agency for undergraduate and graduate schools of business, economics, and accountancy

### Additional Admission Requirements

- GMAT or GRE exam score if undergraduate GPA is less than 3.30
- A current resume
- Students without undergraduate business related degrees will be required to take up to 12 additional credits of foundation courses in accounting and finance (ACCT 608), economics, (ECON 606), business analysis (MGMT 605), and enterprise management (MGMT 612)

### Learning Objectives:

- Students will gain enhanced knowledge of financial accounting processes needed for professional practice and successful completion of professional certification exams.
- Students will understand the application of accounting principles and practices in a global environment.

### Degree Requirements

Total credit hours: 36

- Core courses (24 credits): ACCT 710; ECON 708; FIN 750; MGMT 720, 725, 727, 750; MKTG 716
- Take 12 credits: ACCT 643, 689, 761, 763

## Business Administration - Human Resources Management, MBA

College of Business and Economics

**Graduate Coordinator:** Eric Gladney

**Email:** emgladne@ncat.edu **Phone:** 336-285-3774

**Graduate Coordinator:** Eric Gladney

**Email:** emgladne@ncat.edu **Phone:** 336-285-3774

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The Department of Management offers a program of study leading to the Master of Business Administration degree with a major concentration in Human Resources Management (HRM). The program prepares students and professionals for careers in public and private sector positions in the Human Resources Management function of organizations and managers interested in understanding how to effectively develop and manage human resources. The MBA program is accredited by the AACSB International - The Association to Advance Collegiate Schools of Business International. This is the premier accrediting agency for undergraduate and graduate schools of business, economics, and accountancy. In addition the Human Resources Management concentration is one of few graduate HRM programs certified by the Society of Human Resources Management (SHRM).

### Additional Admission Requirements

- GMAT or GRE exam score if undergraduate GPA is less than 3.30
- A current resume
- Students without undergraduate business related degrees will be required to take up to 12 additional credits of foundation courses in accounting and finance (ACCT 608), economics, (ECON 606), business analysis (MGMT 605), and enterprise management (MGMT 612)

### Learning Objectives:

- Students will understand the concepts and applications of the HRM function, and its contribution to firm performance.
- Students will comprehend the strategic importance of the HRM function as a competitive advantage.
- Students will be able to plan, manage, and revise a HRM function in a professional domestic or global setting, while demonstrating the appropriate responses to ethical, social, and multicultural issues.

### Degree Requirements

Total credit hours: 36

- Core courses (24 credits): ACCT 710; ECON 708; FIN 750; MGMT 720, 725, 727, 750; MKTG 716
- Take 12 credits: MGMT 731, 733, 735, 736

## Business Administration - Supply Chain Systems, MBA

College of Business and Economics

**Graduate Coordinator:** Eric Gladney

**Email:** emgladne@ncat.edu **Phone:** 336-285-3774

**Department Chair:** Joseph Huscroft

**Email:** jrhuscroftjr@ncat.edu **Phone:** 336-334-7632

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The Department of Marketing, Transportation and Supply Chain offers a program of study leading to the Master of Business Administration degree with a major concentration in Supply Chain Systems. The concentration prepares students and professionals for careers in supply chain management. A required business core of study in marketing, accounting and finance, management, information systems, economics and quantitative analysis is blended with business-relevant supply chain management courses and applications. The supply chain management topics covered are purchasing and supply management; global, demand-driven supply chain design and management; and supply chain systems with SAP/ERP. The MBA program is accredited by the AACSB International - The Association to Advance Collegiate Schools of Business International. This is the premier accrediting agency for undergraduate and graduate schools of business, economics, and accountancy.

### Additional Admission Requirements

- GMAT or GRE exam score if undergraduate GPA is less than 3.30
- A current resume
- Students without undergraduate business related degrees will be required to take up to 12 additional credits of foundation courses in accounting and finance (ACCT 608), economics, (ECON 606), business analysis (MGMT 605), and enterprise management (MGMT 612)

### Learning Objectives:

- Students will be able to evaluate the strategic importance of an acquisition process that aligns the supplier network with organizational goals and strategies.
- Students will be able to apply the principles of cost, demand, and supply chain design to effectively manage the information, product, and financial flows through the supply chain to develop value-creating networks
- Students will be able to apply enterprise resource planning to the function of supply chain management

### Degree Requirements

Total credit hours: 36

- Core courses (24 credits): ACCT 710; ECON 708; FIN 750; MGMT 720, 725, 727, 750; MKTG 716
- Take 12 credits: TSCM 701, 720, 725, 727

## Chemical Engineering, MS

College of Engineering

**Graduate Coordinator:** Vinayak Kabadi

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**Phone:** 336-334-7564

**Department Chair:** Stephen Knisley

**Email:** sbknisle@ncat.edu

**Phone:** 336-285-2653

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The graduate Chemical Engineering program prepares students for further study at the doctoral level or for advanced chemical engineering practice in industry. Graduates of the program work in a broad range of fields and create innovative solutions to important industrial and societal problems. Active areas of research include Thermodynamics and Molecular Computation, Catalysis and Reaction Engineering, Transport Processes, Polymers, Energy and Fuels, Environmental Chemical Engineering and Biological Engineering.

### Additional Admission Requirements

- Undergraduate degree in STEM discipline
- Unconditional admission requires an engineering undergraduate degree from an ABET accredited Chemical Engineering program

### Program Outcomes:

- The graduates will perform effectively in an advanced chemical engineering related position in industry or in advanced graduate/professional schools.
- The graduates will demonstrate research leadership skills in using interdisciplinary and advanced approaches or techniques for solving their research or project problems.
- The graduates will be active in professional societies.
- The graduates will enhance their professional credentials through lifelong learning.

### Degree Requirements

Total credit hours: 30

- Core courses (9 credits): CHEN 720, 750, 760

#### Thesis option

- CHEN elective (3 credits): Select 3 credits from CHEN 705, 710, 715
- CHEN electives (6 credits): Select 6 credits from CHEN 600-799
- Engineering electives (6 credits): Select 6 credit hours from CHEN, BMEN, ELEN, ISEN, MEEN, PHYS, CHEM, BIOL, MATH, NANO, EES with approval of advisor
- Participate in CHEN seminar
- Thesis (CHEN 797: 6 credits)
- Pass thesis defense

#### Project option

- CHEN elective (3 credits): Select 3 credits from CHEN 705, 710, 715
- CHEN electives (6 credits): Select 6 credits from CHEN 600-799
- Engineering electives (9 credits): Select 9 credit hours from CHEN, BMEN, ELEN, ISEN, MEEN, PHYS, CHEM, BIOL, MATH, NANO, EES with approval of advisor.
- Project (CHEN 796: 3 credits)
- Participate in CHEN seminar

#### Course option

- CHEN elective (3 credits): Select 3 credits from CHEN 705, 710, 715
- CHEN electives (9 credits): Select 9 credits from CHEN 600-799
- Engineering electives (9 credits): Select 9 credit hours from CHEN, BMEN, ELEN, ISEN, MEEN, PHYS, CHEM, BIOL, MATH, NANO, EES with approval of advisor.
- Participate in CHEN seminar

## Chemistry, MS

College of Science and Technology

**Graduate Coordinator:** Divi Venkateswarlu

**Email:** divi@ncat.edu

**Phone:** 336-285-2236

**Department Chair:** Zerihun Assefa

**Email:** zassefa@ncat.edu

**Phone:** 336-285-2255

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The mission of the MS in Chemistry program at North Carolina Agricultural and Technical State is to provide the theoretical and experimental training for post-baccalaureate students leading to Masters level degrees in chemistry and teaching. The graduate degree program prepares students to pursue advanced professional and doctoral degrees. In addition, courses are offered that may be used for renewal of teacher certificates.

### **Additional Admission Requirements**

- An undergraduate major in chemistry that includes one year of physical chemistry and one year of differential and integral calculus.
- Undergraduate coursework in all of the major areas of Chemistry including physical analytical, organic and inorganic chemistry.
- Two of the three letters of recommendation should be from former science or math professors.

### **Program Outcomes:**

- **Communication:** M.S. candidates will demonstrate the ability to comprehend, apply and evaluate information from chemistry literature which is to be orally presented and validated in a seminar.
- **Chemical Knowledge:** M.S. candidates will demonstrate chemistry proficiency in all four sub-disciplines of chemistry: analytical, inorganic, organic, and physical.
- **Research Training:** M.S. candidates will acquire the basic tools needed to carry out independent chemical research. Students should become proficient in their specialized area of chemistry and successfully complete a written graduate level research project or thesis.

### **Degree Requirements**

Total credit hours: 30

- Core courses (12 credits): CHEM 711, 722, 732, 743

#### Thesis option:

- Seminar (CHEM 792: 1 credit)
- Take 8 credits of additional CHEM courses with approval of advisor
- Supervised Research (CHEM 794: 3 credits)
- Thesis (CHEM 797: 6 credits)
- Pass thesis defense

#### Non-Thesis Option:

- Seminar (CHEM 792: 1 credit)
- Take 14 credits of additional CHEM courses with approval of advisor
- Project (CHEM 796: 3 credits)



## Chemistry – Applied Chemistry and Chemical Sciences PSM, MS

College of Science and Technology

**Graduate Coordinator:** Divi Venkateswarlu      **Email:** divi@ncat.edu      **Phone:** 336-285-2236

**Department Chair:** Zerihun Assefa      **Email:** zassefa@ncat.edu      **Phone:** 336-285-2255

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The Professional Science Master's program in Chemistry has the objective of advancing technical skills, industry-guided knowledge and business management. The program prepares students for career opportunities in businesses utilizing chemical and/or biochemical processes and instrumentation.

### Additional Admission Requirements

- An undergraduate degree in science
- At least one year of physical chemistry and calculus courses consisting of differential and integral equations.
- Two of the three letters of recommendation should be from former science or math professors.

### Program Outcomes:

- **Communication:** M.S. candidates will demonstrate the ability to comprehend, apply and evaluate information from chemistry literature which is to be orally presented and validated in a seminar.
- **Applied Chemistry Knowledge:** M.S. candidates will demonstrate chemistry proficiency in the sub-disciplines of chemistry: analytical, inorganic, organic, biochemistry and physical as it pertains to real life applications and product development
- **Research Training and Ethics:** M.S. candidates will acquire the basic tools needed to carry out independent chemical research. Students should become proficient in their specialized area of chemistry and successfully complete a written graduate level research project designed to address industrial and other collaborative needs.

### Degree Requirements

Total credit hours: 30

- Core courses (12 credits): CHEM 711, 722, 732, 743
- Select 6 credit hours from: BIOL, CHEM, CHEN, MATH, PHYS with approval of advisor
- Select 9 credit hours from: ACCT 708, 714; ECON 706; MGMT 705, 712, 718
- Internship (CHEM 784: 3 credits)

## Civil Engineering, MS

College of Engineering

**Graduate Coordinator:** Manoj Jha

**Email:** mkjha@ncat.edu **Phone:** 336-285-3678

**Department Chair:** Stephanie Luster-Teasley

**Email:** luster@ncat.edu **Phone:** 336-285-3679

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The Master of Science in Civil Engineering program provides advanced study and research in the following areas: Environmental/Water Resources, Structures/Geotechnical, Transportation/Regional Development, Construction Management, and Energy Resources/ Systems.

### Additional Admission Requirements

- Unconditional admission requires undergraduate degree from an ABET accredited Civil Engineering, Architectural Engineering, or Environmental Engineering program

### Degree Requirements

Total credit hours: 30

- Core courses (9 credits): CIEN 700, 702, Advanced Mathematics course (CIEN approved)

#### Thesis option

- CIEN electives (9 credits): Take 9 credits from CIEN 600-799 with approval of advisor
- Electives (6 credits): Take 6 credit hours from CIEN 600-799 or other departments with approval of advisor
- Take CIEN 792 seminar
- Thesis (CIEN 797: 6 credits)
- Pass thesis defense

#### Project option

- CIEN electives (9 credits): Take 9 credits from CIEN 600-799 with approval of advisor
- Electives (9 credits): Take 9 credit hours from CIEN 600-799 or other departments with approval of advisor
- Take CIEN 792 seminar
- Project (CIEN 796: 3 credits)

#### Course option

- CIEN electives (9 credits): Take 9 credits from CIEN 600-799 with approval of advisor
- Electives (12 credits): Take 12 credit hours from CIEN 600-799 or other departments with approval of advisor
- Take CIEN 792 seminar
- Comprehensive exam

## Civil Engineering – Systems Engineering, MS

College of Engineering

**Graduate Coordinator:** Manoj Jha

**Email:** mkjha@ncat.edu **Phone:** 336-285-3678

**Department Chair:** Stephanie Luster-Teasley

**Email:** luster@ncat.edu **Phone:** 336-285-3679

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The Master of Science in Civil Engineering program provides advanced study and research in the following areas: Environmental/Water Resources, Structures/Geotechnical, Transportation/Regional Development, Construction Management, and Energy Resources/ Systems.

### **Additional Admission Requirements**

- Unconditional admission requires undergraduate degree from an ABET accredited Civil Engineering, Architectural Engineering, or Environmental Engineering program

### **Degree Requirements**

Total credit hours: 30

- Core courses (9 credits): CIEN 700, 702, 785
- Systems Engineering Core (9 credit hours): SYEN 605, 710, 715
- Systems Engineering Electives: Take 9 credit hours CIEN 614, 670, 785
- Electives (3 credits): Take 3 credit hours from CIEN 600-799 or other departments with approval of advisor
- Take CIEN 792 seminar

## Computational Science and Engineering, MS

College of Engineering

**Graduate Coordinator:** TBA

**Email:**

**Phone:**

**Department Chair:** Marwan Bikdash

**Email:** bikdash@ncat.edu

**Phone:** 336-334-7437

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The MS in Computational Science and Engineering (CSE) is an interdisciplinary graduate program designed for students who seek to use advanced computational methods to solve large problems in diverse fields ranging from the basic sciences (physics, chemistry, mathematics, etc.) to sociology, biology, engineering, and economics. The mission of Computational Science and Engineering is to graduate professionals who (a) have expertise in developing novel computational methodologies and products, and/or (b) have extended their expertise in specific disciplines (in science, technology, engineering, and socioeconomics) with computational tools. The program offers two tracks: (a) the Computational Methods Track, which is designed primarily for students with undergraduate degrees in engineering, chemistry, physics, mathematics, and computer science who will be trained to develop problem-solving methodologies. Research in this track includes computational system theory, big data and computational statistics, high-performance computing and scientific visualization, multi-scale and multi-physics modeling, computational solid, fluid and nonlinear dynamics, computational geometry, and fast and scalable algorithms; (b) the Computational Applications Track, which is designed primarily for students with undergraduate degrees in chemistry, biology, psychology, business, finance and economics, technology and engineering, and agricultural sciences who will be trained to apply or extend computational tools and methods, as well as data acquisition, processing and visualization techniques, to study computationally intensive problems in their disciplines.

### Additional Admission Requirements

- Approved Bachelor of Science or Bachelor of Engineering degree
- Knowledge of Calculus through differential equations and elementary numerical analysis
- Programming skills and working knowledge of at least one high-level programming language.

### Program Outcomes:

- Students will demonstrate critical thinking and ability in conducting research in engineering, science and mathematics through computational modeling and simulations.
- Students will demonstrate mastery in communicating research results through publications that indicate effective content, organization and adherence to journal publication conventions.
- Students will explain the underlying principles behind scientific visualization of large data sets.
- Students will perform independent research in order to generate a dissertation of an original idea and to publish technical papers.

### Degree Requirements

Total credit hours: 30

- Core courses (12 credits): CSE 702, 703, 801, 804

#### Thesis option

- Electives (9 credits): Take 9 credits from engineering, computer science, mathematics, physics, chemistry, biology, economics, business, agricultural science or other courses approved by the CSE department, with approval of advisor
- Select 2 additional credits to complete 30 credit requirement with approval of advisor. This can be thesis hours, continuation/residency credits, supervised teaching, supervised research, or approved graduate courses with approval of advisor
- At least 18 credit hours should be at 600-700 level

- Seminar (CSE 792: 1 credit)
- Thesis (CSE 797: 6 credits)
- Pass thesis defense

Project option

- Electives (12 credits): Take 12 credits from engineering, computer science, mathematics, physics, chemistry, biology, economics, business, agricultural science or other courses approved by the CSE department, with approval of advisor
- Select 2 additional credits to complete 30 credit requirement with approval of advisor. This can be continuation/residency credits, supervised teaching, supervised research, or approved graduate courses with approval of advisor
- At least 18 credit hours should be at 600-700 level
- Seminar (CSE 789: 1 credit)
- Project (CSE 796: 3 credits)

Course option

- Electives (15 credits): Take 15 credits from engineering, computer science, mathematics, physics, chemistry, biology, economics, business, agricultural science or other courses approved by the CSE department, with approval of advisor
- Select 2 additional credits to complete 30 credit requirement with approval of advisor. This can be continuation/residency credits, supervised teaching, supervised research, or approved graduate courses with approval of advisor
- Seminar (CSE 789: 1 credit)
- At least 18 credit hours should be at 600-700 level

## Computational Science and Engineering – Systems Engineering, MS

College of Engineering

**Graduate Coordinator:** TBA

**Email:**

**Phone:**

**Department Chair:** Marwan Bikdash

**Email:** bikdash@ncat.edu

**Phone:** 336-334-7437

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The MS in Computational Science and Engineering (CSE) is an interdisciplinary graduate program designed for students who seek to use advanced computational methods to solve large problems in diverse fields ranging from the basic sciences (physics, chemistry, mathematics, etc.) to sociology, biology, engineering, and economics. The mission of Computational Science and Engineering is to graduate professionals who (a) have expertise in developing novel computational methodologies and products, and/or (b) have extended their expertise in specific disciplines (in science, technology, engineering, and socioeconomics) with computational tools. The program offers two tracks: (a) the Computational Methods Track, which is designed primarily for students with undergraduate degrees in engineering, chemistry, physics, mathematics, and computer science who will be trained to develop problem-solving methodologies. Research in this track includes computational system theory, big data and computational statistics, high-performance computing and scientific visualization, multi-scale and multi-physics modeling, computational solid, fluid and nonlinear dynamics, computational geometry, and fast and scalable algorithms; (b) the Computational Applications Track, which is designed primarily for students with undergraduate degrees in chemistry, biology, psychology, business, finance and economics, technology and engineering, and agricultural sciences who will be trained to apply or extend computational tools and methods, as well as data acquisition, processing and visualization techniques, to study computationally intensive problems in their disciplines.

### **Additional Admission Requirements**

- Approved Bachelor of Science or Bachelor of Engineering degree
- Knowledge of Calculus through differential equations and elementary numerical analysis
- Programming skills and working knowledge of at least one high-level programming language.

### **Program Outcomes:**

- Students will demonstrate critical thinking and ability in conducting research in engineering, science and mathematics through computational modeling and simulations.
- Students will demonstrate mastery in communicating research results through publications that indicate effective content, organization and adherence to journal publication conventions.
- Students will explain the underlying principles behind scientific visualization of large data sets.
- Students will perform independent research in order to generate a dissertation of an original idea and to publish technical papers.

### **Degree Requirements**

Total credit hours: 30

- Core courses (12 credits): CSE 702, 703, 801, 804
- Systems Engineering Core (9 credit hours): SYEN 605, 710, 715
- Systems Engineering Electives: Take 9 credit hours from: BMEN 695, COMP 722, CSE 805, 806, ECEN 674, ISEN 658

## Computational Science and Engineering, PhD

College of Engineering

**Graduate Coordinator:** TBA

**Email:**

**Phone:**

**Department Chair:** Marwan Bikdash

**Email:** bikdash@ncat.edu

**Phone:** 336-334-7437

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The PhD in Computational Science and Engineering (CSE) is an interdisciplinary graduate program designed for students who seek to use advanced computational methods to solve large problems in diverse fields ranging from the basic sciences (physics, chemistry, mathematics, etc.) to sociology, biology, engineering, and economics. The mission of Computational Science and Engineering is to graduate professionals who (a) have expertise in developing novel computational methodologies and products, and/or (b) have extended their expertise in specific disciplines (in science, technology, engineering, and socioeconomics) with computational tools. The Ph.D. program is designed for students with graduate and undergraduate degrees in a variety of fields including engineering, chemistry, physics, mathematics, computer science, and economics who will be trained to develop problem-solving methodologies and computational tools for solving challenging problems. Research in Computational Science and Engineering includes: computational system theory, big data and computational statistics, high-performance computing and scientific visualization, multi-scale and multi-physics modeling, computational solid, fluid and nonlinear dynamics, computational geometry, fast and scalable algorithms, computational civil engineering, bioinformatics and computational biology, and computational physics.

### Additional Admission Requirements

- Master of Science or Engineering degree in Computational Science and Engineering (CSE) or in science, engineering, business, economics, technology or in a field allied to computational science or computational engineering field.
- GRE scores

### Program Outcomes:

- Students will demonstrate critical thinking and ability in conducting research in engineering, science and mathematics through computational modeling and simulations.
- Students will demonstrate mastery in communicating research results through publications that indicate effective content, organization and adherence to journal publication conventions.
- Students will explain the underlying principles behind scientific visualization of large data sets.
- Students will perform independent research in order to generate a dissertation of an original idea and to publish technical papers.

### Degree Requirements

Total credit hours: 62 (post baccalaureate)

- Core courses (12 credits): CSE 702, 703, 801, 804
- Electives (27 credits): Take 27 credits from engineering, computer science, mathematics, physics, chemistry, biology, economics, business, agricultural science or other courses approved by the CSE department, with approval of advisor
- Select 6 additional credits to complete 62 credit requirement with approval of advisor. This can be dissertation hours, continuation/residency credits, supervised teaching, supervised research, or approved graduate courses with approval of advisor
- At least 26 credit hours should be at 800-900 level
- Seminar (CSE 992: 2 credits)
- Dissertation (CSE 997: 15 credits)
- Pass qualifying exam, preliminary exam, dissertation defense

**Dissertation Research:**

A student may not register for dissertation credits before passing Qualifying Examination. No more than 15 dissertation credits are counted toward the total credit hours requirement for the degree.

**Qualifying Examination:**

The Qualifying Examination is given to assess the student's competence in a broad range of relevant subject areas. Only students with unconditional status and in good academic standing may take the Qualifying Examination. A student who wants to retake the Qualifying Examination must apply to retake the Qualifying Examination by the posted deadline. No student is permitted to take the Qualifying Examination more than twice. A student not recommended for re-examination or who fails the exam on a second attempt may be dismissed from the doctoral program.

**Preliminary Oral Examination:**

The Preliminary Oral Examination is conducted by the student's dissertation committee and is a defense of the student's dissertation proposal. Passing this exam satisfies requirements for Ph.D. Candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Admission to Candidacy**

Student will be admitted to candidacy upon successful completion of the Qualifying Exam and the Preliminary oral Exam.

**Final Oral Examination:**

The Final Oral Examination is conducted by the student's dissertation committee. This examination is the final dissertation defense presentation that is scheduled after a dissertation is completed. The examination may be held no earlier than one semester (or four months) after admission to candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Submission of Dissertation:**

Upon passing the Ph.D. Final Oral Examination, the Ph.D. student must have the dissertation approved by each member of the student's dissertation committee. The approved dissertation must be submitted to The Graduate College by the deadline given in the academic calendar, and must conform to the Graduate College's guidelines for theses and dissertations.



## Computer Science, MS

College of Engineering

**Graduate Coordinator:** Huiming (Anna) Yu **Email:** cshmyu@ncat.edu Phone: 336-285-3699

**Department Chair:** Xiaohong (Dorothy) Yuan **Email:** xhyuan@ncat.edu Phone: 336-334-7245

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The MS in Computer Science program combines computer science fundamentals with practical knowledge and technical excellence in the most advanced technologies. Research is funded by agencies including the National Aeronautics and Space Administration, the U.S. Air Force, the National Security Agency, the Naval Oceanographic Office, National Science Foundation and among others. The research interests of the faculty include software engineering, information assurance, secure software engineering, artificial intelligence, computational science, distributed systems, multi-agent systems, computer security, trustworthy cloud computing and high performance computing. In addition to a general track, five additional tracks are offered in Software Engineering, Computational Science and Engineering, Information Assurance, Secure Software Engineering and Artificial Intelligence.

### Additional Admission Requirements

- Unconditional admission requires a BS in Computer Science

### Program Outcomes:

Graduates of the Computer Science Master's program will be able to: (1) apply knowledge of complex mathematics and computer science to develop software solutions to real world problems, (2) analyze and synthesize novel solutions to critical problems within the area of computer science, (3) design and implement software systems, (4) understand professional, legal and ethical issues, (5) effectively communicate, both orally and in writing, and (6) engage in lifelong learning.

### Degree Requirements

Total credit hours: 30

- Core courses (9 credits): COMP 710, 755, 775

#### Thesis option

- COMP electives (9 credits): Take 9 credits of additional COMP 700-899 courses with approval of advisor
- Electives (6 credits): Take 6 credit hours from COMP 700-899 or other departments with approval of advisor
- Thesis (COMP 797: 6 credits)
- Pass thesis defense

#### Project option

- COMP electives (12 credits): Take 12 credits of additional COMP 700-899 courses with approval of advisor
- Electives (6 credits): Take 6 credit hours from COMP 700-899 or other departments with approval of advisor
- Project (COMP 796: 3 credits)

#### Course option

- COMP electives (15 credits): Take 15 credits of additional COMP 700-899 courses with approval of advisor
- Electives (6 credits): Take 6 credit hours from COMP 700-899 or other departments with approval of advisor

## Computer Science, PhD

College of Engineering

**Graduate Coordinator:** Huiming (Anna) Yu **Email:** cshmyu@ncat.edu Phone: 336-285-3699

**Department Chair:** Xiaohong (Dorothy) Yuan **Email:** xhyuan@ncat.edu Phone: 336-334-7245

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The Ph.D. program in Computer Science presents both advanced instruction and opportunities for independent research. The Ph.D. degree is the highest academic degree offered, and graduates typically find employment as researchers in government or industry laboratories or as university faculty. Earning a Ph.D. degree requires initiative and responsibility, and the student is expected to make a significant contribution to computer-science knowledge by investigating a topic that is recognized as significant.

### Additional Admission Requirements

- Bachelor of Science in computer science with a minimum GPA of 3.5 over the last 60 course credit hours of the undergraduate degree or Master of Science degree in Computer Science with a minimum GPA of 3.25.
- GRE test scores

### Program Outcomes

- Graduates of the Ph.D. program will conduct advanced research in such computer science areas as information security, distributed systems, and artificial intelligence.
- Graduates will develop the ability to identify research problems in computer science and to develop solutions for them.
- Graduates will develop the ability to address important computing problems from a variety of areas, including business, the environment, the State's economy, healthcare, and law enforcement.
- Graduates will develop the ability to examine certain grand challenge problems in the discipline.
- Graduates will acquire the skills and abilities to be effective educators in computer science at the university level.

### Degree Requirements

Total credit hours: 63 (post baccalaureate)

- Core courses (9 credits): COMP 710, 755, 775
- COMP electives (24 credits): Take 24 credits of additional COMP 700-899 courses with approval of advisor
- Electives (6 credits): Take 6 credit hours from COMP 700-899 or other departments with approval of advisor
- Take 6 credit hours: COMP 892, 994
- Dissertation (18 credits): COMP 997
- Pass qualifying exam, preliminary exam, dissertation defense

### Dissertation Research:

A student may not register for dissertation credits before passing Qualifying Examination. No more than 18 dissertation credits are counted toward the total credit hours requirement for the degree.

### Qualifying Examination:

The Qualifying Examination is given to assess the student's competence in a broad range of relevant subject areas. Only students with unconditional status and in good academic standing may take the Qualifying Examination. A student who wants to retake the Qualifying Examination must apply to retake the Qualifying Examination by the posted deadline. No student is permitted to take the Qualifying Examination

more than twice. A student not recommended for re-examination or who fails the exam on a second attempt may be dismissed from the doctoral program.

**Preliminary Oral Examination:**

The Preliminary Oral Examination is conducted by the student's dissertation committee and is a defense of the student's dissertation proposal. Passing this exam satisfies requirements for Ph.D. Candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Admission to Candidacy**

Student will be admitted to candidacy upon successful completion of the Qualifying Exam and the Preliminary oral Exam.

**Final Oral Examination:**

The Final Oral Examination is conducted by the student's dissertation committee. This examination is the final dissertation defense presentation that is scheduled after a dissertation is completed. The examination may be held no earlier than one semester (or four months) after admission to candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Submission of Dissertation:**

Upon passing the Ph.D. Final Oral Examination, the Ph.D. student must have the dissertation approved by each member of the student's dissertation committee. The approved dissertation must be submitted to The Graduate College by the deadline given in the academic calendar, and must conform to the Graduate College's guidelines for theses and dissertations.

## Electrical Engineering, MS

**School/College:** College of Engineering

**Graduate Coordinator:** John Kelly   **Email:** jck@ncat.edu   **Phone:** (336) 285-3712

**Department Chair:** Abdullah Eroglu   **Email:** aeroglu@ncat.edu   **Phone:** (336) 285-3712

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The Master of Science Program in Electrical Engineering provides graduate level education for advanced professional practice or further graduate studies. The program offers the following four tracks: Computer Engineering, Communications and Signal Processing, Electronic and Optical Materials and Devices, and Power Systems and Control.

### **Additional Admission Requirements:**

- Unconditional admission requires an undergraduate degree in Electrical Engineering from an ABET accredited institution with an overall 3.0 GPA in all engineering courses.

### **Degree requirements**

Total credit hours: 30

- Required courses (9 credits): ECEN 649, 650, 656 or ECEN 621, 623, 647 or ECEN 625, 629, 702 or ECEN 668, 678, 870

#### Thesis option

- ECEN electives (9 credits): Take 9 credits from ECEN 600-800 with approval of advisor
- Technical Electives (6 credits): Take 6 credit hours with approval of advisor
- Thesis (ECEN 797: 6 credits)
- Attend master's seminar
- Pass thesis defense
- At least 18 credit hours should be at 600-700 level

#### Project option

- ECEN electives (9 credits): Take 9 credits from ECEN 600-800 with approval of advisor
- Technical Electives (9 credits): Take 9 credit hours with approval of advisor
- Project (ECEN 796: 3 credits)
- Attend master's seminar
- At least 18 credit hours should be at 600-700 level

#### Course option

- ECEN electives (9 credits): Take 9 credits from ECEN 600-800 with approval of advisor
- Technical Electives (12 credits): Take 12 credit hours with approval of advisor
- Attend master's seminar
- Pass exit exam
- At least 18 credit hours should be at 600-700 level

## Electrical Engineering, PhD

**School/College:** College of Engineering

**Graduate Coordinator:** John Kelly **Email:** jck@ncat.edu **Phone:** (336) 285-3712

**Department Chair:** Abdullah Eroglu **Email:** aeroglu@ncat.edu **Phone:** (336) 285-3712

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The Doctoral Program in Electrical Engineering offers the following four tracks: Computer Engineering, Communications and Signal Processing, Electronic and Optical Materials and Devices, and Power Systems and Control.

### **Additional Admission Requirements**

- Bachelor's degree in electrical/computer engineering from an ABET accredited university or from an acceptable institution of higher learning with an earned GPA of 3.5 or higher over the last 60 course credit hours of undergraduate degree or Master of Science in Electrical Engineering, Computer Engineering, or a related discipline from an acceptable institution of higher learning, and prior research experience.
- GRE scores
- At least one of the letters of recommendations must come from an individual knowledgeable of the student's graduate performance and potential

### **Degree Requirements**

Total credit hours: 60 (post baccalaureate)

- Required courses (9 credits): ECEN 649, 650, 656 or ECEN 621, 623, 647 or ECEN 625, 629, 702 or ECEN 668, 678, 870
- ECEN electives (30 credits): Take 30 credits from ECEN 600-800 with approval of advisor
- Technical Electives (9 credits): Take 9 credit hours with approval of advisor
- Attend doctoral seminar
- Dissertation (ECEN 997: 12 credits)
- Pass qualifying exam, preliminary exam, dissertation defense
- At least 24 credit hours of course work should be at 800 level

### **Dissertation Research:**

A student may not register for dissertation credits before passing Qualifying Examination. No more than 12 dissertation credits are counted toward the total credit hours requirement for the degree.

### **Qualifying Examination:**

The Qualifying Examination is given to assess the student's competence in a broad range of relevant subject areas. Only students with unconditional status and in good academic standing may take the Qualifying Examination. A student who wants to retake the Qualifying Examination must apply to retake the Qualifying Examination by the posted deadline. No student is permitted to take the Qualifying Examination more than twice. A student not recommended for re-examination or who fails the exam on a second attempt may be dismissed from the doctoral program.

### **Preliminary Oral Examination:**

The Preliminary Oral Examination is conducted by the student's dissertation committee and is a defense of the student's dissertation proposal. Passing this exam satisfies requirements for Ph.D. Candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

### **Admission to Candidacy**

Student will be admitted to candidacy upon successful completion of the Qualifying Exam and the Preliminary oral Exam.

**Final Oral Examination:**

The Final Oral Examination is conducted by the student's dissertation committee. This examination is the final dissertation defense presentation that is scheduled after a dissertation is completed. The examination may be held no earlier than one semester (or four months) after admission to candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Submission of Dissertation:**

Upon passing the Ph.D. Final Oral Examination, the Ph.D. student must have the dissertation approved by each member of the student's dissertation committee. The approved dissertation must be submitted to The Graduate College by the deadline given in the academic calendar, and must conform to the Graduate College's guidelines for theses and dissertations.

## Elementary Education K-6, MAEd

College of Education

**Graduate Coordinator:** Tyrette Carter

**Email:** tscarte1@ncat.edu

**Phone:** 336-285-4424

**Department Chair:** Tyrette Carter

**Email:** tscarte1@ncat.edu

**Phone:** 336-285-4424

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The Master of Arts in Education (MAEd) Elementary Education program prepares highly-qualified K-6 classroom teachers who utilize research-verified pedagogical approaches to engage students from diverse populations in developmentally-appropriate, rigorous, and relevant instruction. Through courses in research and inquiry, current research in the elementary classroom, standards and accountability, and issues and trends in urban education, candidates in the Master of Arts in Education, Elementary Education program develop knowledge, skills, dispositions, and professional attitudes that empower them to become lifelong learners, skilled researchers, and exemplary educational leaders inside and outside K-6 learning contexts while concurrently developing the skills necessary to attain certification from the National Board Professional Teaching Standards. The MAEd program in Elementary Education is aligned with professional standards commensurate with the Interstate Teacher Assessment and Support Consortium (InTASC), the National Council for the Accreditation of Teacher Education (NCATE), the North Carolina Department of Public Instruction (NCDPI), and National Board Professional Teaching Standards (NBPTS). The Master of Arts in Education (MAEd) program in Elementary Education is an accredited program by the National Council for the Accreditation of Teacher Education (NCATE) and by the North Carolina Department of Public Instruction (NCDPI).

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability register for certain required courses. Applicants and current students should review licensure requirements at <http://www.ncat.edu/academics/schools-colleges1/soe/teacher-education/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- Graduate Record Examination (GRE) Scores
- Standard Professional 1 or 2 NC Teaching License in the area of study
- Two Page Double-Spaced Statement of Purpose or Intent

### Program Outcomes:

Candidates in the MAED Elementary Education program will: (1) demonstrate effective research writing skills appropriate for educational scholars, (2) demonstrate effective knowledge, skills, and attitudes in diversity issues, learning theories, technological skills, and methods of instruction, (3) demonstrate the ability to implement research-based content pedagogy aligned to the North Carolina Common Core and Essential Skills Standards with K-6 students, and (4) demonstrate their depth of content knowledge and breadth of content pedagogical skills for K-6 students from diverse backgrounds.

### Degree Requirements

Total credit hours: 30

- Core courses (9 credit hours): CUIN 711, 729, 783
- Select 9 credits from: ELED 751, 752, 753, 754
- Phase II: Take 12 credits: ELED 719, 740, 755, 757

## English and African American Literature, MA

College of Arts Humanities and Social Sciences

**Graduate Coordinator:** Hope Jackson

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**Department Chair:** Jason DePolo

**Email:** jdepolo@ncat.edu

**Phone:** 336-285-3506

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The objective of the M.A. program in English and African American literature is to provide in-depth training in English Education; English, American and African American literature; folklore and language. The department introduces students to a diverse range of graduate-level work, including critical theory, graduate literary studies, and contemporary practices in grammar and rhetoric. Students' exposure to various genres and works of African American, American and English literatures will provide a substantial foundation for continued study at the doctoral level as well as preparation for various professional and teaching contexts. The program provides students the opportunity to explore critical theories and hone their critical reading, thinking and writing skills. It also offers a solid foundation for those who may choose to seek a Ph.D. in such disciplines as African American, Comparative, and English Literatures as well as African American, Africana, Cultural, Ethnic, Gender, Subaltern and Women's Studies.

### **Additional Admission Requirements**

1. At least 24 undergraduate credit hours in English
2. Writing Sample (undergraduate research paper, literary analysis, etc.)

### **Degree Requirements**

Total credit hours: 30

- Core Courses (9 credit hours): ENGL 700, 753, 755

#### Thesis Option

- Select 9 (or 6) credit hours in African American Literature from: ENGL 631, 650, 652, 656, 658, 660, 744, 760, 762, 764, 790
- Select 6 (or 9) credit hours in English and American Literature from: ENGL 603, 628, 631, 653, 672, 701, 703, 705, 706, 707, 709, 712, 721, 722, 723, 724, 731, 744, 790
- Thesis: ENGL 797 (6)

#### Non-Thesis Option

- Select 12 credit hours in African American Literature from: ENGL 631, 650, 652, 656, 658, 660, 744, 760, 762, 764, 790
- Select 9 credit hours in English and American Literature from: ENGL 603, 628, 631, 653, 672, 701, 703, 705, 706, 707, 709, 712, 721, 722, 723, 724, 731, 744, 790



## Food and Nutritional Sciences, MS

College of Agriculture and Environmental Science

**Graduate Coordinator:** Heather Colleran

**Email:** hcolleran@ncat.edu

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**Department Chair:** Valerie L. Giddings

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**Phone:** 336-334-7850

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The Master of Science in Food and Nutritional Sciences is designed to develop the basic knowledge and skills necessary to undertake research in Food and Nutritional Sciences and other related areas. It also develops competencies to work as food and nutrition specialists in education, or with other community nutrition agencies and food industries. The program also develops theoretical and experimental competencies necessary to pursue additional graduate studies or obtain professional degrees.

### Additional Admission Requirements

1. Unconditional admission requires an earned baccalaureate degree in food and nutrition or related field from an accredited institution and a GPA of 2.80 or higher
2. Applicants without the following background courses or their equivalent will be required to take them as prerequisites:
  - FCS 157: Introduction to Human Nutrition
  - FCS 245: Introduction to Food Science
  - CHEM 251: Elementary Biochemistry and biochemistry Laboratory (CHEM 255)
3. Resume

### Program Outcomes:

1. Upon completion of their coursework, students will accurately communicate in writing their knowledge of advanced concepts and principles related to food and nutritional sciences.
2. Upon completion of their coursework, students will effectively express in an oral presentation their knowledge of food and nutritional sciences concepts, principles and trends.
3. Upon completion of core courses, students will read and analyze scholarly literature in food and nutritional sciences for accuracy of research techniques and contributions to the discipline.
4. Upon completion of the thesis option, students will develop research questions, hypotheses and research methodology to address a problem in the field of food and nutritional sciences.
5. Upon completion of the program, students will identify and apply appropriate theories to address food and nutrition related issues impacting society.

### Degree Requirements

Total credit hours: 30

- Take Core courses (1 credits): FCS 711, 730, 735, 789; CHEM 651; ABM 705
- (1 credit) FCS 789
- 

#### Thesis option:

- Electives
  - Food Science Concentration: Select 6 credit hours from Food Science Electives
  - Nutrition Science Concentration: Select 6 credit hours from Food Science Electives
- Thesis (FCS 797: 6 credits)
- FCS 999: Continuation of Thesis
- Pass thesis defense
- Pass comprehensive exam

#### Non-thesis Option:

- Electives
  - Food Science Concentration: Select 6 credit hours from Food Science Electives
  - Nutrition Science Concentration: Select 6 credit hours from Food Science Electives

- Practicum (FCS 784: 3 credits)
- FCS or approved electives related to food and nutritional sciences or research (4 credits)
- Pass comprehensive exam

## Industrial and Systems Engineering, MS

College of Engineering

**Graduate Coordinator:** Younho Seong

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**Phone:** 336-285-3734

**Department Chair:** Paul Stanfield

**Email:** stanfiel@ncat.edu

**Phone:** 336-334-7780

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The Master of Science (M.S.) in Industrial and Systems Engineering (ISE) program prepares students for successful careers in industry and continuation to doctoral study. The program emphasizes the systems engineering, collaboration and engagement skills critical to addressing the complex societal problems of tomorrow. ISE graduate students tackle these problems in a supportive environment working with nationally-recognized faculty. ISE programs are inclusive of many undergraduate majors. Any engineering major may choose graduate education in ISE to expand systems skills. Many related non-engineering majors might choose ISE with some background courses to expand technical capability.

### **Program Outcomes:**

The Master of Science in Industrial and Systems Engineering program will prepare graduates to:

- Decompose systems into component parts and logically model and evaluate using mathematical, statistical and computational tools.
- Construct and improve integrated systems or processes consisting of people, materials, information, equipment and energy considering life cycle factors.
- Formulate and solve multi-objective problems using industrial and systems engineering methods and tools.
- Apply systems analysis, synthesis, and problem-solving to real world settings to reduce cost and improve productivity and quality.
- Perform presentable research under the supervision of a faculty member.
- Communicate Industrial and Systems technical information a professional level in written, oral, and business graphics formats.

### **Degree Requirements:**

Total credit hours: 30

- Core courses (12 credits): ISEN 625, 655, 665, 675

#### Thesis option

- ISEN electives (12 credits): Take 12 credits of additional ISEN courses with approval of advisor
- Thesis (ISEN797: 6 credits)
- ISEN Seminar: Take twice in two semesters

#### Project option

- ISEN electives (15 credits): Take 15 credits of additional ISEN courses with approval of advisor
- Project (ISEN 796: 3 credits)
- ISEN Seminar: Take twice in two semesters

#### Course option

- ISEN electives (18 credits): Take 18 credits of additional ISEN courses with approval of advisor
- Capstone Project
- ISEN Seminar: Take twice in two semesters

## Industrial and Systems Engineering – Systems Engineering, MS

College of Engineering

**Graduate Coordinator:** Younho Seong

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**Department Chair:** Paul Stanfield

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**Phone:** 336-334-7780

---

The Master of Science (M.S.) in Industrial and Systems Engineering (ISE) program prepares students for successful careers in industry and continuation to doctoral study. The program emphasizes the systems engineering, collaboration and engagement skills critical to addressing the complex societal problems of tomorrow. ISE graduate students tackle these problems in a supportive environment working with nationally-recognized faculty. ISE programs are inclusive of many undergraduate majors. Any engineering major may choose graduate education in ISE to expand systems skills. Many related non-engineering majors might choose ISE with some background courses to expand technical capability.

### **Program Outcomes:**

The Master of Science in Industrial and Systems Engineering program will prepare graduates to:

- Decompose systems into component parts and logically model and evaluate using mathematical, statistical and computational tools.
- Construct and improve integrated systems or processes consisting of people, materials, information, equipment and energy considering life cycle factors.
- Formulate and solve multi-objective problems using industrial and systems engineering methods and tools.
- Apply systems analysis, synthesis, and problem-solving to real world settings to reduce cost and improve productivity and quality.
- Perform presentable research under the supervision of a faculty member.
- Communicate Industrial and Systems technical information a professional level in written, oral, and business graphics formats.

### **Degree Requirements:**

Total credit hours: 30

- Core courses (12 credits): ISEN 625, 655, 665, 675
- Systems Engineering Core (9 credit hours): SYEN 605, 710, 715
- Systems Engineering Electives: Take 9 credit hours: ISEN 658, 664, 721
- ISEN Seminar: Take twice in two semesters

## Industrial and Systems Engineering, PhD

College of Engineering

**Graduate Coordinator:** Tonya Smith-Jackson **Email:** tsmithj@ncat.edu

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**Department Chair:** Paul Stanfield

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The Doctor of Philosophy (Ph.D.) in Industrial and Systems Engineering (ISE) program prepares students for successful careers as teachers, researchers, and leaders in academia, industry and the public sector. The program emphasizes the systems engineering, collaboration and engagement skills critical to addressing the complex societal problems of tomorrow. ISE graduate students tackle these problems in a supportive environment working with nationally-recognized faculty.

### Additional Admission Requirements

- At least one degree in Engineering or Computer Science.
- Bachelor of Science degree in Engineering or Computer Science from an ABET accredited program with a cumulative GPA of 3.5 or above or Master of Science degree in a discipline related to Industrial & Systems Engineering with a cumulative GPA of 3.3
- A Graduate Record Exam (GRE) Aptitude Exam score

### Program Outcomes:

The Doctor of Philosophy in Industrial and Systems Engineering program will prepare graduates to

- Demonstrate broad knowledge of industrial and systems engineering sub-disciplines and deep knowledge of a specific sub-discipline.
- Effectively teach industrial and systems engineering methods and tools.
- Independently perform research with mentoring from a faculty member.
- Decompose systems into component parts and logically model and evaluate using mathematical, statistical and computational tools.
- Construct and improve integrated systems or processes consisting of people, materials, information, equipment and energy considering life cycle factors.
- Formulate and solve multi-objective problems using industrial and systems engineering methods and tools.
- Communicate Industrial and Systems Engineering research information in written, oral, and presentation formats.

### Degree Requirements:

Total credit hours: 69 (post baccalaureate)

- Core courses (12 credits): ISEN 625, 655, 665, 675
- ISEN specified courses (12 credits): Select 12 credit hours from ISEN 721, 812, 813, 814, 821 or ISEN 833, 841, 852, 853
- ISEN courses (12 credits): Take additional 12 credit hours of graduate level ISEN courses with approval of advisor
- Engineering courses (12 credits): Take 12 credit hours of additional engineering courses at 700 or 800 level with approval of advisor
- At least 21 course credits should be at 800 level
- Seminar (3 credits): Take ISEN 992 three times in three semesters
- Dissertation (18 credits): ISEN 997
- Pass qualifying exam, preliminary exam, dissertation defense

### Dissertation Research:

A student may not register for dissertation credits before passing Qualifying Examination. No more than 18 dissertation credits are counted toward the total credit hours requirement for the degree.

**Qualifying Examination:**

The Qualifying Examination is given to assess the student's competence in a broad range of relevant subject areas. Only students with unconditional status and in good academic standing may take the Qualifying Examination. A student who wants to retake the Qualifying Examination must apply to retake the Qualifying Examination by the posted deadline. No student is permitted to take the Qualifying Examination more than twice. A student not recommended for re-examination or who fails the exam on a second attempt may be dismissed from the doctoral program.

**Preliminary Oral Examination:**

The Preliminary Oral Examination is conducted by the student's dissertation committee and is a defense of the student's dissertation proposal. Passing this exam satisfies requirements for Ph.D. Candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Admission to Candidacy**

Student will be admitted to candidacy upon successful completion of the Qualifying Exam and the Preliminary oral Exam.

**Final Oral Examination:**

The Final Oral Examination is conducted by the student's dissertation committee. This examination is the final dissertation defense presentation that is scheduled after a dissertation is completed. The examination may be held no earlier than one semester (or four months) after admission to candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Submission of Dissertation:**

Upon passing the Ph.D. Final Oral Examination, the Ph.D. student must have the dissertation approved by each member of the student's dissertation committee. The approved dissertation must be submitted to The Graduate College by the deadline given in the academic calendar, and must conform to the Graduate College's guidelines for theses and dissertations.

## Information Technology, MS

College of Science and Technology

**Graduate Coordinator:** Qing-An Zeng

**Department Chair:** Qing-An Zeng

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**Phone:** 336-285-3148

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The Master of Science in Information Technology prepares students to pursue technical, as well as management careers in all employment sectors. The program emphasizes acquisition of sound theoretical concepts with intensive “hands-on” experience in the area of information technology. The courses are taught by faculty with high level expertise gained through their research activity, affiliations with industry and professional experience. Graduates of the program work in a variety of positions, some of which include: database administrator, network administrator, system analyst, IT consultant, and project manager. Recent graduates are employed with John Deere, IBM, USAA, EMC, Accenture, BB&T, First Citizens, Met Life, AT&T, General Electric, Northrop Grumman, BlueCross BlueShield, and local, state, and federal agencies. Students also have the opportunity to pursue Doctoral study.

### Learning Outcomes

- **Communication Skills:** Students completing the MS degree program in Information Technology will exhibit effective communication skills (written, oral, graphic and interpersonal) appropriate for professionals in this field of study at the master’s level.
- **Critical Thinking Skills:** Students completing the MS degree program in Information Technology will effectively use quantitative and/or qualitative analytical problem-solving skills appropriate for professionals in this field of study at the master’s level.
- **Disciplinary Expertise:** Students completing the MS degree program in Information Technology will demonstrate a level of discipline-specific expertise (knowledge, skills, and professionalism) appropriate for professionals in information technology at the master’s level.
- **Research/Creative Engagement:** Students completing the MS degree program in Information Technology will demonstrate an ability to engage productively in the review and conduct of disciplinary research and creative professional activity appropriate for professionals in information technology at the master’s level.

### Degree Requirements

Total credit hours: 30

- Core courses (9 credit hours): ITT 700, 702, 703

#### Thesis option

- Select 15 credit hours from: ITT 605, 610, 615, 620, 625, 650, 655, 665, 685, 725, 729, 731, 735, 745, 750, 752, 789; ECT 759
- Thesis: Select 6 credit hours from: ITT 791, 792, 793, 794

#### Non-Thesis option

- Select 21 credit hours from: ITT 605, 610, 615, 620, 625, 650, 655, 665, 685, 725, 729, 731, 735, 745, 750, 752, 789; ECT 759

## Leadership Studies, PhD

College of Education

**Graduate Coordinator:** Karen Jackson

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**Department Chair:** Bernadine Chapman

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**Phone:** (336) 285-2141

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The doctoral program in leadership studies prepares tomorrow's leaders to solve societal challenges through the study of theoretical and practical knowledge in leadership studies. Through its commitment to civic engagement, transformative research and creative scholarship the program produces critically minded scholars who are social justice advocates capable of transforming organizations to maximize human potential.

### Additional Admission Requirements

- Graduate Record Examinations (GRE), Graduate Management Admission Test (GMAT), or Miller Analogies Test (MAT)
- Three additional professional letters of recommendation from professors or employers. The recommendation letters should be submitted by the same individuals who complete the recommendation form included in the standard Graduate College application.
- A current resume or curriculum vita
- Statement of Purpose: In two double-spaced pages explain how earning a Ph.D. in Leadership Studies fits in with your academic/professional and personal goals; describe one or two of the key research topics that you may want to investigate as part of your research agenda; and discuss a key leadership lesson you have learned from your leadership experiences within or outside your profession.
- Master's or J.D. from a college or university recognized by a regional or general accrediting agency.
- Minimum cumulative Grade Point Average of 3.50 (on a 4.00 scale) in all graduate coursework.
- At least five years of professional work experience at the executive or managerial level
- Interview: After initial review of all applications, the most qualified candidates will be invited for a group interview with the Leadership Studies faculty.

### Program Outcomes

- Demonstrate understanding of major leadership theories in Leadership Studies, and the ability to analyze and critique these theories, and apply these theories in diverse settings.
- Effectively demonstrate decision making skills and a repertoire of knowledge needed to lead, organize, and engage diverse local, national, and global communities.
- Able to use a range of perspectives from interdisciplinary fields of study particularly to provide leadership that addresses societal challenges.
- Articulate an understanding of the role of ethics in leadership, and develop ethical reasoning as well as reflection skills that promote social justice.
- Demonstrate the ability to design, analyze, critique, and conduct research using qualitative, quantitative, and mixed methods research techniques.

### Degree Requirements

Total credit hours: 48 (post master's)

- Take Core courses (12 credits): LEST 800, 802, 810, 818
- Take 9 credit hours: LEST 815, 860, 862
- Select 3 credits from: LEST 817, 861, 863, 864, 865, INST 753, or another methodology course with approval of advisor
- Take LEST 850 (3 credits)
- Select 9 credits in LEST or related areas with approval of advisor
- Dissertation (12 credits): LEST 997



- Pass qualifying exam, preliminary exam, dissertation defense

**Dissertation Research:**

A student may not register for dissertation credits before passing Qualifying Examination. No more than 12 dissertation credits are counted toward the total credit hours requirement for the degree.

**Qualifying Examination:**

The Qualifying Examination is given to assess the student's competence in a broad range of relevant subject areas. Only students with unconditional status and in good academic standing may take the Qualifying Examination. A student who wants to retake the Qualifying Examination must apply to retake the Qualifying Examination by the posted deadline. No student is permitted to take the Qualifying Examination more than twice. A student not recommended for re-examination or who fails the exam on a second attempt may be dismissed from the doctoral program.

**Preliminary Oral Examination:**

The Preliminary Oral Examination is conducted by the student's dissertation committee and is a defense of the student's dissertation proposal. Passing this exam satisfies requirements for Ph.D. Candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Admission to Candidacy**

Student will be admitted to candidacy upon successful completion of the Qualifying Exam and the Preliminary Oral Exam.

**Final Oral Examination:**

The Final Oral Examination is conducted by the student's dissertation committee. This examination is the final dissertation defense presentation that is scheduled after a dissertation is completed. The examination may be held no earlier than one semester (or four months) after admission to candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Submission of Dissertation:**

Upon passing the Ph.D. Final Oral Examination, the Ph.D. student must have the dissertation approved by each member of the student's dissertation committee. The approved dissertation must be submitted to The Graduate College by the deadline given in the academic calendar, and must conform to the Graduate College's guidelines for theses and dissertations.

## Master of Arts in Teaching - Biology Education, MAT

College of Education

**Graduate Coordinator:** Cailisha L. Petty

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**Phone:** (336) 285-2174

**Department Chair:** Robert Ferguson

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**Phone:** (336) 285-4411

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Situated within the School of Education's conceptual framework of "Professional Educator: A Catalyst for Learning," the Master of Arts in Teaching (MAT) in Biology Education program is designed for college graduates who have decided to enter the teaching profession, many of whom will already be lateral entry teachers. Graduates of the program are licensed by the North Carolina Department of Public Instruction to teach Biology or related courses in grades 9 to 12. All Teacher Education programs are accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction. The Masters of Art in Teaching will enable prospective teachers, who bring content knowledge to the graduate degree, the opportunity to develop the knowledge, skills, and dispositions to become excellent teachers.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability to register for certain required courses. Applicants and current students should review licensure requirements and other teacher education requirements at <https://www.ncat.edu/ced/cepp/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- 24 credit hours of biology or content-related course work with a grade of C or better
- Verification of criminal background
- Admission requires an undergraduate GPA of 2.8 or higher

### Program Outcomes

- Student Learning Outcome 1- Content Knowledge: Candidates in the MAT Program will illustrate their ability to align learning theories, content knowledge, pedagogical content knowledge, and the Common Core and North Carolina Essential Standards as indicated by passing scores on licensure exams.
- Student Learning Outcome 2- Communication: Candidates in the MAT Program will use effective communication for defusing and deescalating disruptive or dangerous behavior, and safe and appropriate seclusion and restraint; use a variety of methods to communicate effectively with all students; and, consistently encourage and support students to articulate thoughts and ideas clearly and effectively.
- Student Learning Outcome 3- Critical Thinking: Candidates in the MAT Program will use quantitative and qualitative problem solving skills as measured by Clinical Practice Performance Form.
  - 1.e1 Evaluates the progress of students toward high school graduation using a variety of assessment data measuring goals of the North Carolina Standards.
  - 4e.1 Integrates specific instruction that helps students develop the ability to apply processes and strategies for critical thinking and problem solving.
  - 4h.1 Uses multiple indicators, both formative and summative, to monitor and evaluates student's progress and to inform instruction.
  - 5a.1 Uses data to provide ideas about what can be done to improve students' learning.

**Degree Requirements**

Total Credit Hours: 30

Core Courses (9 credit hours)

EDPR 600; EDPR 615; SPED 661

Additional Courses (21 credit hours)

EDPR 601; EDPR 611; EDPR 612; EDPR 620; EDPR 784; EDPR 785

## Master of Arts in Teaching - Business Education, MAT

College of Education

**Graduate Coordinator:** Cailisha L. Petty

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**Phone:** (336) 285-2174

**Department Chair:** Robert Ferguson

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**Phone:** (336) 285-4411

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Situated within the School of Education's conceptual framework of "Professional Educator: A Catalyst for Learning," the Master of Arts in Teaching (MAT) in Business Education is designed for college graduates who have earned a bachelor's degree in a business discipline. Graduates of the program are licensed by the North Carolina Department of Public Instruction to teach Business education courses in grades 6 to 12. In addition to pursuing careers in public education, graduates of the MAT in Business Education also have the opportunity to seek positions in the workplace as business trainers. The degree enables candidates to develop the knowledge, skills, and dispositions needed to become excellent teachers. All Teacher Education programs are accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction. The Business Education program is accredited by AACSB International.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability to register for certain required courses. Applicants and current students should review licensure requirements and other teacher education requirements at <https://www.ncat.edu/ced/cepp/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- 24 credit hours of business or content-related course work with a grade of C or better
- Verification of criminal background
- Admission requires an undergraduate GPA of 2.8 or higher

### Program Outcomes

- Student Learning Outcome 1- Content Knowledge: Candidates in the MAT Program will illustrate their ability to align learning theories, content knowledge, pedagogical content knowledge, and the Common Core and North Carolina Essential Standards as indicated by passing scores on licensure exams.
- Student Learning Outcome 2- Communication: Candidates in the MAT Program will use effective communication for defusing and deescalating disruptive or dangerous behavior, and safe and appropriate seclusion and restraint; use a variety of methods to communicate effectively with all students; and, consistently encourage and support students to articulate thoughts and ideas clearly and effectively.
- Student Learning Outcome 3- Critical Thinking: Candidates in the MAT Program will use quantitative and qualitative problem solving skills as measured by Clinical Practice Performance Form.
  - 1.e1 Evaluates the progress of students toward high school graduation using a variety of assessment data measuring goals of the North Carolina Standards.
  - 4e.1 Integrates specific instruction that helps students develop the ability to apply processes and strategies for critical thinking and problem solving.
  - 4h.1 Uses multiple indicators, both formative and summative, to monitor and evaluates student's progress and to inform instruction.
  - 5a.1 Uses data to provide ideas about what can be done to improve students' learning.

**Degree Requirements**

Total Credit Hours: 30

Core Courses (9 credit hours)

EDPR 600; EDPR 615; SPED 661

Additional Courses (21 credit hours)

EDPR 601; EDPR 611; EDPR 612; EDPR 620; EDPR 784; EDPR 785

## Master of Arts in Teaching - Chemistry Education, MAT

College of Education

**Graduate Coordinator:** Cailisha L. Petty

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**Department Chair:** Robert Ferguson

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**Phone:** (336) 285-4411

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Situated within the School of Education's conceptual framework of "Professional Educator: A Catalyst for Learning," the Master of Arts in Teaching (MAT) in Chemistry Education program is designed for college graduates who have decided to enter the teaching profession, many of whom will already be lateral entry teachers. Graduates of the program are licensed by the North Carolina Department of Public Instruction to teach Chemistry or related courses in grades 9 to 12. All Teacher Education programs are accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction. The Masters of Art in Teaching will enable prospective teachers, who bring content knowledge to the graduate degree, the opportunity to develop the knowledge, skills, and dispositions to become excellent teachers.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability to register for certain required courses. Applicants and current students should review licensure requirements and other teacher education requirements at <https://www.ncat.edu/ced/cepp/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- 24 credit hours of chemistry or content-related course work with a grade of C or better
- Verification of criminal background
- Admission requires an undergraduate GPA of 2.8 or higher

### Program Outcomes

- Student Learning Outcome 1- Content Knowledge: Candidates in the MAT Program will illustrate their ability to align learning theories, content knowledge, pedagogical content knowledge, and the Common Core and North Carolina Essential Standards as indicated by passing scores on licensure exams.
- Student Learning Outcome 2- Communication: Candidates in the MAT Program will use effective communication for defusing and deescalating disruptive or dangerous behavior, and safe and appropriate seclusion and restraint; Use a variety of methods to communicate effectively with all students; consistently encourage and support students to articulate thoughts and ideas clearly and effectively.
- Student Learning Outcome 3- Critical Thinking: Candidates in the MAT Program will use quantitative and qualitative problem solving skills as measured by Clinical Practice Performance Form.
  - 1.e1 Evaluates the progress of students toward high school graduation using a variety of assessment data measuring goals of the North Carolina Standards.
  - 4e.1 Integrates specific instruction that helps students develop the ability to apply processes and strategies for critical thinking and problem solving.
  - 4h.1 Uses multiple indicators, both formative and summative, to monitor and evaluates student's progress and to inform instruction.
  - 5a.1 Uses data to provide ideas about what can be done to improve students' learning.

**Degree Requirements**

Total Credit Hours: 30

Core Courses (9 credit hours)

EDPR 600; EDPR 615; SPED 661

Additional Courses (21 credit hours)

EDPR 601; EDPR 611; EDPR 612; EDPR 620; EDPR 784; EDPR 785

## Master of Arts in Teaching - Child Dev, Early Edu and Family Studies B-K, MAT

College of Education

**Graduate Coordinator:** Cailisha L. Petty

**Email:** mrspetty@ncat.edu

**Phone:** (336) 285-2174

**Department Chair:** Robert Ferguson

**Email:** rferguson1@ncat.edu

**Phone:** (336) 285-4411

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Situated within the School of Education's conceptual framework of "Professional Educator: A Catalyst for Learning," the Master of Arts in Teaching (MAT) in Child Development, Early Education and Family Studies Birth–Kindergarten prepares students to 1) master the knowledge, skills and dispositions required for the Birth–Kindergarten license; 2) analyze theoretical perspectives and current research, to conduct research and to apply this knowledge toward reflective, evidence-based practice in teaching and working with families; and 3) assume diverse professional and leadership roles in a wide variety of educational and community settings. All Teacher Education programs are accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability to register for certain required courses. Applicants and current students should review licensure requirements and other teacher education requirements at <https://www.ncat.edu/ced/cepp/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- 24 credit hours of content-related course work with a grade of C or better
- Verification of criminal background
- Admission requires an undergraduate GPA of 2.8 or higher

### Program Outcomes

- Student Learning Outcome 1- Content Knowledge: Candidates in the MAT Program will illustrate their ability to align learning theories, content knowledge, pedagogical content knowledge, and the Common Core and North Carolina Essential Standards as indicated by passing scores on licensure exams.
- Student Learning Outcome 2- Communication: Candidates in the MAT Program will use effective communication for defusing and deescalating disruptive or dangerous behavior, and safe and appropriate seclusion and restraint; use a variety of methods to communicate effectively with all students; and, consistently encourage and support students to articulate thoughts and ideas clearly and effectively.
- Student Learning Outcome 3- Critical Thinking: Candidates in the MAT Program will use quantitative and qualitative problem solving skills as measured by Clinical Practice Performance Form.
  - 1.e1 Evaluates the progress of students toward high school graduation using a variety of assessment data measuring goals of the North Carolina Standards.
  - 4e.1 Integrates specific instruction that helps students develop the ability to apply processes and strategies for critical thinking and problem solving.
  - 4h.1 Uses multiple indicators, both formative and summative, to monitor and evaluates student's progress and to inform instruction.
  - 5a.1 Uses data to provide ideas about what can be done to improve students' learning.



**Degree Requirements**

Total Credit Hours: 30

Core Courses (9 credit hours)

EDPR 600; EDPR 615; SPED 661

Additional Courses (21 credit hours)

FCS 629; FCS 639; FCS 659; FCS 701; EDPR 784; EDPR 785

## Master of Arts in Teaching - Elementary Education K-6, MAT

College of Education

**Graduate Coordinator:** Cailisha L Petty

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**Department Chair:** Robert Ferguson

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Situated within the School of Education's conceptual framework of "Professional Educator: A Catalyst for Learning," the mission of the Master of Arts in Teaching (MAT) in Elementary Education (K-6) degree program is to prepare highly-qualified classroom teachers for the K-6 classroom. Through courses in elementary-grades mathematics, social studies, language development, diagnostic and prescriptive reading, and assessment and evaluation, candidates in the Master of Arts in Teaching, Elementary Education program develop knowledge, skills, dispositions, and professional attitudes that empower them to become lifelong learners and exemplary educational leaders inside and outside K-6 learning contexts. Graduates of the program are licensed by the North Carolina Department of Public Instruction to teach Chemistry or related courses in grades K to 6. All Teacher Education programs are accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction. The Masters of Art in Teaching will enable prospective teachers, who bring content knowledge to the graduate degree, the opportunity to develop the knowledge, skills, and dispositions to become excellent teachers.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability register for certain required courses. Applicants and current students should review licensure requirements and other teacher education requirements at <https://www.ncat.edu/ced/cepp/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- 24 credit hours of content-related course work with a grade of C or better
- Verification of criminal background
- Admission requires an undergraduate GPA of 2.8 or higher

### Program Outcomes

- SLO 1 Content Knowledge: Candidates in the MAT Program will illustrate their ability to align learning theories, content knowledge, pedagogical content knowledge, and the Common Core and North Carolina Essential Standards as indicated by passing scores on licensure exams.
- Student Learning Outcome 2- Communication: Candidates in the MAT Program will use effective communication for defusing and deescalating disruptive or dangerous behavior, and safe and appropriate seclusion and restraint; use a variety of methods to communicate effectively with all students; and, consistently encourage and support students to articulate thoughts and ideas clearly and effectively.
- SLO 3 Critical Thinking: Candidates in the MAT Program will use quantitative and qualitative problem solving skills as measured by Clinical Practice Performance Form.
  - 1.e1 Evaluates the progress of students toward high school graduation using a variety of assessment data measuring goals of the North Carolina Standards.
  - 4e.1 Integrates specific instruction that helps students develop the ability to apply processes and strategies for critical thinking and problem solving.
  - 4h.1 Uses multiple indicators, both formative and summative, to monitor and evaluates student's progress and to inform instruction.

- 5a.1 Uses data to provide ideas about what can be done to improve students' learning.

**Degree Requirements**

Total Credit Hours: 30

Core Courses (9 credit hours)

EDPR 600; EDPR 615; SPED 661

Additional Courses (21 credit hours)

ELED 612; CUIN 612; CUIN 613; CUIN 620; EDPR 784; EDPR 785

## Master of Arts in Teaching - English Education, MAT

College of Education

**Graduate Coordinator:** Cailisha L. Petty

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**Department Chair:** Robert Ferguson

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**Phone:** (336) 285-4411

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Situated within the School of Education's conceptual framework of "Professional Educator: A Catalyst for Learning," the Master of Arts in Teaching (MAT) in English Education program is designed for college graduates who have decided to enter the teaching profession, many of whom will already be lateral entry teachers. Graduates of the program are licensed by the North Carolina Department of Public Instruction to teach English or related courses in grades 9 to 12. All Teacher Education programs are accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction. The Masters of Art in Teaching will enable prospective teachers, who bring content knowledge to the graduate degree, the opportunity to develop the knowledge, skills, and dispositions to become excellent teachers.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability to register for certain required courses. Applicants and current students should review licensure requirements and other teacher education requirements at <https://www.ncat.edu/ced/cepp/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- 24 credit hours of English or content-related course work with a grade of C or better
- Verification of criminal background
- Admission requires an undergraduate GPA of 2.8 or higher

### Program Outcomes

- Student Learning Outcome 1- Content Knowledge: Candidates in the MAT Program will illustrate their ability to align learning theories, content knowledge, pedagogical content knowledge, and the Common Core and North Carolina Essential Standards as indicated by passing scores on licensure exams.
- Student Learning Outcome 2- Communication: Candidates in the MAT Program will use effective communication for defusing and deescalating disruptive or dangerous behavior, and safe and appropriate seclusion and restraint; use a variety of methods to communicate effectively with all students; and, consistently encourage and support students to articulate thoughts and ideas clearly and effectively.
- Student Learning Outcome 3- Critical Thinking: Candidates in the MAT Program will use quantitative and qualitative problem solving skills as measured by Clinical Practice Performance Form.
  - 1.e1 Evaluates the progress of students toward high school graduation using a variety of assessment data measuring goals of the North Carolina Standards.
  - 4e.1 Integrates specific instruction that helps students develop the ability to apply processes and strategies for critical thinking and problem solving.
  - 4h.1 Uses multiple indicators, both formative and summative, to monitor and evaluates student's progress and to inform instruction.
  - 5a.1 Uses data to provide ideas about what can be done to improve students' learning.

**Degree Requirements**

Total Credit Hours: 30

Core Courses (9 credit hours)

EDPR 600; EDPR 615; SPED 661

Additional Courses (21 credit hours)

EDPR 601; EDPR 611; EDPR 612; EDPR 620; EDPR 784; EDPR 785

## Master of Arts in Teaching - Family and Consumer Sciences Education, MAT

College of Education

**Graduate Coordinator:** Cailisha L. Petty

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**Department Chair:** Robert Ferguson

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Situated within the School of Education's conceptual framework of "Professional Educator: A Catalyst for Learning," the Master of Arts in Teaching in Family and Consumer Sciences prepares students to 1) master the knowledge, skills and dispositions required for the Family and Consumer Sciences license; 2) analyze theoretical perspectives and current research, to conduct research and to apply this knowledge toward reflective, evidence-based practice in teaching and working with families; and 3) assume diverse professional and leadership roles in a wide variety of educational and community settings. The Master of Arts in Teaching (MAT) in Family and Consumer Sciences Education program is designed for college graduates who have decided to enter the teaching profession, many of whom will already be lateral entry teachers. Graduates of the program are licensed by the North Carolina Department of Public Instruction to teach Family and Consumer Science or related courses in grades 6 to 12. The program is accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability to register for certain required courses. Applicants and current students should review licensure requirements and other teacher education requirements at <https://www.ncat.edu/ced/cepp/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- 24 credit hours of content-related course work with a grade of C or better
- Verification of criminal background
- Admission requires an undergraduate GPA of 2.8 or higher

### Program Outcomes

- Student Learning Outcome 1- Content Knowledge: Candidates in the MAT Program will illustrate their ability to align learning theories, content knowledge, pedagogical content knowledge, and the Common Core and North Carolina Essential Standards as indicated by passing scores on licensure exams.
- Student Learning Outcome 2- Communication: Candidates in the MAT Program will use effective communication for defusing and deescalating disruptive or dangerous behavior, and safe and appropriate seclusion and restraint; use a variety of methods to communicate effectively with all students; and, consistently encourage and support students to articulate thoughts and ideas clearly and effectively.
- Student Learning Outcome 3- Critical Thinking: Candidates in the MAT Program will use quantitative and qualitative problem solving skills as measured by Clinical Practice Performance Form.
  - 1.e1 Evaluates the progress of students toward high school graduation using a variety of assessment data measuring goals of the North Carolina Standards.
  - 4e.1 Integrates specific instruction that helps students develop the ability to apply processes and strategies for critical thinking and problem solving.

- 4h.1 Uses multiple indicators, both formative and summative, to monitor and evaluates student's progress and to inform instruction.
- 5a.1 Uses data to provide ideas about what can be done to improve students' learning.

**Degree Requirements**

Total Credit Hours: 30

Core Courses (9 credit hours)

EDPR 600; EDPR 615; SPED 661

Additional Courses (21 credit hours)

FCS 702; FCS 703; FCS 681; FCS graduate level course; EDPR 784; EDPR 785

## Master of Arts in Teaching - Health and Physical Education, MAT

College of Education

**Graduate Coordinator:** Cailisha L. Petty

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**Department Chair:** Robert Ferguson

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Situated within the School of Education's conceptual framework of "Professional Educator: A Catalyst for Learning," the Master of Arts in Teaching (MAT) in Health and Physical Education program is designed for college graduates who have decided to enter the teaching profession, many of whom will already be lateral entry teachers. Graduates of the program are licensed by the North Carolina Department of Public Instruction to teach Health and Physical Education or related courses in grades K to 12. All Teacher Education programs are accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction. The Masters of Art in Teaching will enable prospective teachers, who bring content knowledge to the graduate degree, the opportunity to develop the knowledge, skills, and dispositions to become excellent teachers.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability to register for certain required courses. Applicants and current students should review licensure requirements and other teacher education requirements at <https://www.ncat.edu/ced/cepp/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- 24 credit hours of health/physical education or content-related course work with a grade of C or better
- Verification of criminal background
- Admission requires an undergraduate GPA of 2.8 or higher

### Program Outcomes

- Student Learning Outcome 1- Content Knowledge: Candidates in the MAT Program will illustrate their ability to align learning theories, content knowledge, pedagogical content knowledge, and the Common Core and North Carolina Essential Standards as indicated by passing scores on licensure exams.
- Student Learning Outcome 2- Communication: Candidates in the MAT Program will use effective communication for defusing and deescalating disruptive or dangerous behavior, and safe and appropriate seclusion and restraint; use a variety of methods to communicate effectively with all students; and, consistently encourage and support students to articulate thoughts and ideas clearly and effectively.
- Student Learning Outcome 3- Critical Thinking: Candidates in the MAT Program will use quantitative and qualitative problem solving skills as measured by Clinical Practice Performance Form.
  - 1.e1 Evaluates the progress of students toward high school graduation using a variety of assessment data measuring goals of the North Carolina Standards.
  - 4e.1 Integrates specific instruction that helps students develop the ability to apply processes and strategies for critical thinking and problem solving.
  - 4h.1 Uses multiple indicators, both formative and summative, to monitor and evaluates student's progress and to inform instruction.
  - 5a.1 Uses data to provide ideas about what can be done to improve students' learning.



**Degree Requirements**

Total Credit Hours: 30

Core Courses (9 credit hours)

EDPR 600; EDPR 615; SPED 661

Additional Courses (21 credit hours)

EDPR 601; HPED 613; HPED 612; HPED 610; EDPR 784; EDPR 785

## Master of Arts in Teaching - History Education, MAT

College of Education

**Graduate Coordinator:** Cailisha L. Petty

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**Phone:** (336) 285-2174

**Department Chair:** Robert Ferguson

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**Phone:** (336) 285-4411

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Situated within the School of Education's conceptual framework of "Professional Educator: A Catalyst for Learning," the Master of Arts in Teaching (MAT) in History Education program is designed for college graduates who have decided to enter the teaching profession, many of whom will already be lateral entry teachers. Graduates of the program are licensed by the North Carolina Department of Public Instruction to teach History or related courses in grades 9 to 12. All Teacher Education programs are accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction. The Masters of Art in Teaching will enable prospective teachers, who bring content knowledge to the graduate degree, the opportunity to develop the knowledge, skills, and dispositions to become excellent teachers.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability to register for certain required courses. Applicants and current students should review licensure requirements and other teacher education requirements at <https://www.ncat.edu/ced/cepp/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- 24 credit hours of history or content-related course work with a grade of C or better
- Verification of criminal background
- Admission requires an undergraduate GPA of 2.8 or higher

### Program Outcomes

- Student Learning Outcome 1- Content Knowledge: Candidates in the MAT Program will illustrate their ability to align learning theories, content knowledge, pedagogical content knowledge, and the Common Core and North Carolina Essential Standards as indicated by passing scores on licensure exams.
- Student Learning Outcome 2- Communication: Candidates in the MAT Program will use effective communication for defusing and deescalating disruptive or dangerous behavior, and safe and appropriate seclusion and restraint; use a variety of methods to communicate effectively with all students; and, consistently encourage and support students to articulate thoughts and ideas clearly and effectively.
- Student Learning Outcome 3- Critical Thinking: Candidates in the MAT Program will use quantitative and qualitative problem solving skills as measured by Clinical Practice Performance Form.
  - 1.e1 Evaluates the progress of students toward high school graduation using a variety of assessment data measuring goals of the North Carolina Standards.
  - 4e.1 Integrates specific instruction that helps students develop the ability to apply processes and strategies for critical thinking and problem solving.
  - 4h.1 Uses multiple indicators, both formative and summative, to monitor and evaluates student's progress and to inform instruction.
  - 5a.1 Uses data to provide ideas about what can be done to improve students' learning.

**Degree Requirements**

Total Credit Hours: 30

Core Courses (9 credit hours)

EDPR 600; EDPR 615; SPED 661

Additional Courses (21 credit hours)

EDPR 601; EDPR 611; EDPR 612; EDPR 620; EDPR 784; EDPR 785

## Master of Arts in Teaching - Mathematics Education, MAT

College of Education

**Graduate Coordinator:** Cailisha L. Petty

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**Phone:** (336) 285-2174

**Department Chair:** Robert Ferguson

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**Phone:** (336) 285-4411

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Situated within the School of Education's conceptual framework of "Professional Educator: A Catalyst for Learning," the Master of Arts in Teaching (MAT) in Mathematics Education program is designed for college graduates who have decided to enter the teaching profession, many of whom will already be lateral entry teachers. Graduates of the program are licensed by the North Carolina Department of Public Instruction to teach Mathematics or related courses in grades 9 to 12. All Teacher Education programs are accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction. The Masters of Art in Teaching will enable prospective teachers, who bring content knowledge to the graduate degree, the opportunity to develop the knowledge, skills, and dispositions to become excellent teachers.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability to register for certain required courses. Applicants and current students should review licensure requirements and other teacher education requirements at <https://www.ncat.edu/ced/cepp/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- 24 credit hours of mathematics or content-related course work with a grade of C or better
- Verification of criminal background
- Admission requires an undergraduate GPA of 2.8 or higher

### Program Outcomes

- Student Learning Outcome 1- Content Knowledge: Candidates in the MAT Program will illustrate their ability to align learning theories, content knowledge, pedagogical content knowledge, and the Common Core and North Carolina Essential Standards as indicated by passing scores on licensure exams.
- Student Learning Outcome 2- Communication: Candidates in the MAT Program will use effective communication for defusing and deescalating disruptive or dangerous behavior, and safe and appropriate seclusion and restraint; use a variety of methods to communicate effectively with all students; and, consistently encourage and support students to articulate thoughts and ideas clearly and effectively.
- Student Learning Outcome 3- Critical Thinking: Candidates in the MAT Program will use quantitative and qualitative problem solving skills as measured by Clinical Practice Performance Form.
  - 1.e1 Evaluates the progress of students toward high school graduation using a variety of assessment data measuring goals of the North Carolina Standards.
  - 4e.1 Integrates specific instruction that helps students develop the ability to apply processes and strategies for critical thinking and problem solving.
  - 4h.1 Uses multiple indicators, both formative and summative, to monitor and evaluates student's progress and to inform instruction.
  - 5a.1 Uses data to provide ideas about what can be done to improve students' learning.

**Degree Requirements**

Total Credit Hours: 30

Core Courses (9 credit hours)

EDPR 600; EDPR 615; SPED 661

Additional Courses (21 credit hours)

EDPR 601; EDPR 611; EDPR 612; EDPR 620; EDPR 784; EDPR 785

## Master of Arts in Teaching - Special Education General Curriculum K-12, MAT

College of Education

**Graduate Coordinator:** Cailisha L. Petty

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**Department Chair:** Robert Ferguson

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Situated within the School of Education's conceptual framework of "Professional Educator: A Catalyst for Learning," the mission of the Master of Arts in Teaching (MAT) in Special Education: General Curriculum (K-12) degree program is to prepare highly-qualified classroom teacher leaders who serve students with mild/moderate disabilities in diverse settings. Through courses which focus on characteristics of learners with special needs, evidence based special education methods used in inclusive and other settings, diagnostic and prescriptive reading and math, assessment and IEP development, classroom and behavior management, educational and assistive technology and other content, candidates in the Master of Arts in Teaching: Special Education program develop knowledge, skills, dispositions, and professional attitudes that empower them to become lifelong learners and exemplary educational leaders inside and outside K-12 learning contexts. The MAT program in Special Education is aligned with professional standards commensurate with the North Carolina Department of Public Instruction (NCDPI), The Council for Exceptional Children, and the National Council for the Accreditation of Teacher Education (NCATE).

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability register for certain required courses. Applicants and current students should review licensure requirements and other teacher education requirements at <https://www.ncat.edu/ced/cepp/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- 24 credit hours of content-related course work with a grade of C or better
- Verification of criminal background
- Admission requires an undergraduate GPA of 2.8 or higher

### Program Outcomes

- Student Learning Outcome 1- Content Knowledge: Candidates in the MAT Program will illustrate their ability to align learning theories, content knowledge, pedagogical content knowledge, and the Common Core and North Carolina Essential Standards as indicated by passing scores on licensure exams.
- Student Learning Outcome 2- Communication: Candidates in the MAT Program will use effective communication for defusing and deescalating disruptive or dangerous behavior, and safe and appropriate seclusion and restraint; use a variety of methods to communicate effectively with all students; and, consistently encourage and support students to articulate thoughts and ideas clearly and effectively.
- Student Learning Outcome 3- Critical Thinking: Candidates in the MAT Program will use quantitative and qualitative problem solving skills as measured by Clinical Practice Performance Form.
  - 1.e1 Evaluates the progress of students toward high school graduation using a variety of assessment data measuring goals of the North Carolina Standards.
  - 4e.1 Integrates specific instruction that helps students develop the ability to apply processes and strategies for critical thinking and problem solving.

- 4h.1 Uses multiple indicators, both formative and summative, to monitor and evaluates student's progress and to inform instruction.
- 5a.1 Uses data to provide ideas about what can be done to improve students' learning.

**Degree Requirements**

Total Credit Hours: 30

Core Courses (9 credit hours)

EDPR 600; EDPR 615; SPED 661

Additional Courses (21 credit hours)

ELED 612; SPED 639; SPED 763; SPED 764; EDPR 784; EDPR 785

## Master of Arts in Teaching - Technology Education, MAT

College of Education

**Graduate Coordinator:** Cailisha L. Petty

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**Department Chair:** Robert Ferguson

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Situated within the School of Education's conceptual framework of "Professional Educator: A Catalyst for Learning," the Master of Arts in Teaching (MAT) in Technology Education program is designed for college graduates who have decided to enter the teaching profession, many of whom will already be lateral entry teachers. Graduates of the program are licensed by the North Carolina Department of Public Instruction to teach Technology or related courses in grades 9 to 12. All Teacher Education programs are accredited by the National Council for Accreditation of Teacher Education (NCATE) and approved by the North Carolina Department of Public Instruction. The Masters of Art in Teaching will enable prospective teachers, who bring content knowledge to the graduate degree, the opportunity to develop the knowledge, skills, and dispositions to become excellent teachers.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability to register for certain required courses. Applicants and current students should review licensure requirements and other teacher education requirements at <https://www.ncat.edu/ced/cepp/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- 24 credit hours of technology or content-related course work with a grade of C or better
- Verification of criminal background
- Admission requires an undergraduate GPA of 2.8 or higher

### Program Outcomes

- **SLO 1 Content Knowledge:** Candidates in the MAT Program will illustrate their ability to align learning theories, content knowledge, pedagogical content knowledge, and the Common Core and North Carolina Essential Standards as indicated by passing scores on licensure exams.
- **Student Learning Outcome 2- Communication:** Candidates in the MAT Program will use effective communication for defusing and deescalating disruptive or dangerous behavior, and safe and appropriate seclusion and restraint; use a variety of methods to communicate effectively with all students; and, consistently encourage and support students to articulate thoughts and ideas clearly and effectively.
- **SLO 3 Critical Thinking:** Candidates in the MAT Program will use quantitative and qualitative problem solving skills as measured by Clinical Practice Performance Form.
  - 1.e1 Evaluates the progress of students toward high school graduation using a variety of assessment data measuring goals of the North Carolina Standards.
  - 4e.1 Integrates specific instruction that helps students develop the ability to apply processes and strategies for critical thinking and problem solving.
  - 4h.1 Uses multiple indicators, both formative and summative, to monitor and evaluates student's progress and to inform instruction.
  - 5a.1 Uses data to provide ideas about what can be done to improve students' learning.

### Degree Requirements

Total Credit Hours: 30



Core Courses (9 credit hours)

EDPR 600; EDPR 615; SPED 661

Additional Courses (21 credit hours)

EDPR 601; EDPR 611; TECH 708; EDPR 620; EDPR 784; EDPR 785

## Mechanical Engineering, MS

College of Engineering

**Graduate Coordinator:** John Kizito

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**Department Chair:** Frederick Ferguson

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The Mechanical Engineering master's program provides advanced level study in distinct areas of specialization such as mechanics and materials, energy and thermal/fluid systems, design and manufacturing, and aerospace. The program prepares the graduate student for doctoral level studies or for advanced mechanical engineering practice in industry, consulting or government service.

### Additional Admission Requirements

- Unconditional admission requires an engineering undergraduate degree from an ABET accredited mechanical engineering program

### Program Outcomes

- Students will develop advanced critical thinking skills by solving complex and challenging problems in mechanical engineering, mathematics and the physical sciences
- Students will communicate effectively by conveying their ideas, both orally and in written form, in accordance with acceptable published standards
- Students will demonstrate their ability to perform research by generating a thesis of an original idea and publishing technical papers under the guidance of an academic advisor
- Graduates will engage in professional activities by attending conferences, presenting papers and serving various roles in professional organizations

### Degree Requirements

Total credit hours: 30

- Core courses (9 credits): MEEN 601, 643, 716

#### Thesis option

- MATH electives (3 credits): Take 3 credit hours from MATH 650, 651, 652
- MEEN electives (9 credits): Take 9 credits of additional MEEN 600-899 courses with approval of advisor
- Technical electives (3 credits): Take additional 3 credit hours with approval of advisor
- Thesis (MEEN 797: 6 credits)
- Pass thesis defense

#### Project option

- MATH electives (3 credits): Take 3 credit hours from MATH 650, 651, 652
- MEEN electives (9 credits): Take 9 credits of additional MEEN 600-899 courses with approval of advisor
- Technical electives (6 credits): Take additional 6 credit hours with approval of advisor
- Project (MEEN 796: 3 credits)

#### Course option

- MATH electives (3 credits): Take 3 credit hours from MATH 650, 651, 652
- MEEN electives (9 credits): Take 9 credits of additional MEEN 600-899 courses with approval of advisor
- Technical electives (9 credits): Take additional 9 credit hours with approval of advisor
- Pass comprehensive exam

## Mechanical Engineering – Systems Engineering, MS

College of Engineering

**Graduate Coordinator:** John Kizito

**Email:** jpkizito@ncat.edu

**Phone:** 336-285-3747

**Department Chair:** Frederick Ferguson

**Email:** fferguso@ncat.edu

**Phone:** 336-285-2135

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The Mechanical Engineering master's program provides advanced level study in distinct areas of specialization such as mechanics and materials, energy and thermal/fluid systems, design and manufacturing, and aerospace. The program prepares the graduate student for doctoral level studies or for advanced mechanical engineering practice in industry, consulting or government service.

### **Additional Admission Requirements**

- Unconditional admission requires an engineering undergraduate degree from an ABET accredited mechanical engineering program

### **Program Outcomes**

- Students will develop advanced critical thinking skills by solving complex and challenging problems in mechanical engineering, mathematics and the physical sciences
- Students will communicate effectively by conveying their ideas, both orally and in written form, in accordance with acceptable published standards
- Students will demonstrate their ability to perform research by generating a thesis of an original idea and publishing technical papers under the guidance of an academic advisor
- Graduates will engage in professional activities by attending conferences, presenting papers and serving various roles in professional organizations

### **Degree Requirements**

Total credit hours: 30

- Core courses (9 credits): MEEN 601, 643, 716
- Systems Engineering Core (9 credit hours): SYEN 605, 710, 715
- Systems Engineering Electives: Take 9 credit hours from: MEEN 614, 619, 652, 669, 680, 815
- MATH electives (3 credits): Take 3 credit hours from MATH 650, 651, 652

## Mechanical Engineering, PhD

College of Engineering

**Graduate Coordinator:** John Kizito

**Email:** jpkizito@ncat.edu

**Phone:** 336-285-3747

**Department Chair:** Frederick Ferguson

**Email:** fferguso@ncat.edu

**Phone:** 336-285-2135

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The Ph.D. degree in Mechanical Engineering provides both advanced instruction and independent research opportunities for students. Graduates are typically employed in research environments in government laboratories and industries, and as university faculty. The Ph.D. degree program is highly individualistic in nature, and the student is expected to make a significant contribution to the reservoir of human knowledge by investigating a significant topic within the domain of mechanical engineering.

### Additional Admission Requirements

- Bachelor of Science degree in Mechanical Engineering with a minimum cumulative GPA of 3.5 or Master of Science degree in Mechanical Engineering or a closely related engineering discipline with a minimum GPA of 3.3
- GRE score

### Program Outcomes

- Graduates of the Ph.D. program will apply their critical thinking skills to invent, analyze, and model complex engineering systems and make novel contributions to the discipline.
- Graduates of the Ph.D. program will demonstrate effective communication skills through project and dissertation work and conference presentations.
- Graduates of the Ph.D. program will perform research or undertake advanced projects in an area of mechanical engineering such as mechanical systems and materials, energy and thermal-fluid sciences, and aerospace and make novel contributions in their respective areas of research.
- Graduates of the Ph.D. program will be active and effective leaders in their professional societies.

### Degree Requirements

Total credit hours: 62 (post baccalaureate)

- Core courses (9 credits): MEEN 601, 643, 716
- MATH electives (3 credits): Take 3 credit hours from MATH 650, 651, 652
- MEEN electives (24 credits): Take 24 credits of additional MEEN 600-899 courses with approval of advisor
- Technical electives (6 credits): Take additional 6 credit hours with approval of advisor
- Seminar (2 credits): Take MEEN 992 two times in two semesters
- Dissertation (18 credits): MEEN 997
- Pass qualifying exam, preliminary exam, dissertation defense

### Dissertation Research:

A student may not register for dissertation credits before passing Qualifying Examination. No more than 18 dissertation credits are counted toward the total credit hours requirement for the degree.

### Qualifying Examination:

The Qualifying Examination is given to assess the student's competence in a broad range of relevant subject areas. Only students with unconditional status and in good academic standing may take the Qualifying Examination. A student who wants to retake the Qualifying Examination must apply to retake the Qualifying Examination by the posted deadline. No student is permitted to take the Qualifying Examination more than twice. A student not recommended for re-examination or who fails the exam on a second attempt may be dismissed from the doctoral program.

**Preliminary Oral Examination:**

The Preliminary Oral Examination is conducted by the student's dissertation committee and is a defense of the student's dissertation proposal. Passing this exam satisfies requirements for Ph.D. Candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Admission to Candidacy**

Student will be admitted to candidacy upon successful completion of the Qualifying Exam and the Preliminary oral Exam.

**Final Oral Examination:**

The Final Oral Examination is conducted by the student's dissertation committee. This examination is the final dissertation defense presentation that is scheduled after a dissertation is completed. The examination may be held no earlier than one semester (or four months) after admission to candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Submission of Dissertation:**

Upon passing the Ph.D. Final Oral Examination, the Ph.D. student must have the dissertation approved by each member of the student's dissertation committee. The approved dissertation must be submitted to The Graduate College by the deadline given in the academic calendar, and must conform to the Graduate College's guidelines for theses and dissertations.

## Mental Health Counseling – Clinical, MS

College of Education

**Graduate Coordinator:** Patricia Bethea-Whitfield **Email:** [betheap@ncat.edu](mailto:betheap@ncat.edu) **Phone:** (336) 285-4384

**Department Chair:** Tyra Turner Whittaker **Email:** [tnwhitta@ncat.edu](mailto:tnwhitta@ncat.edu) **Phone:** (336) 285-4386

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The Mental Health Counseling - Clinical program is a generalist program that is nationally accredited by the Council on the Accreditation of Counseling and Related Educational Programs (CACREP). This designation indicates curricular experiences encompassing each of the eight core areas of professional counseling including Professional Identity, Social and Cultural Diversity, Human Growth and Development, Career Development, Helping Relationships, Group Work, Assessment, and Research and Program Evaluation. Other required coursework includes clinical assessment and substance abuse. This degree prepares graduates to work in a variety of capacities such as marriage and family counseling, substance abuse counseling, clinical mental health counseling, college counseling, non-profit work, business settings, and many other areas. The U.S. Department of Labor projects that counseling is growing faster than average with some areas of clinical mental health counseling seeing growth rates up to 34% by 2016.

### Additional Admission Requirements

- Statement of purpose: Describe career goals, research interests and a list of publications, professional and volunteer experience relevant to intended program of study, academic honors and organizations.
- Three professional letters of recommendation from persons who know the applicant in either an academic or supervisory capacity. Letters from family members, acquaintances, and friends are not acceptable
- A current resume or curriculum vita
- Interview: After initial review of all applications, the applicants with greatest potential are also expected to participate in a pre-admission interview with the Counseling faculty. Pre-admission interviews can include: (a) individual interviews, (b) group interaction with observation, and (c) on-site writing sample.

### Program Outcomes:

- **Critical Thinking:** Students will develop skills and attitudes of effective thinking that employ the use of thoughtful reflection and logical inquiry to draw evidence-based conclusions as they relate to community counseling.
- **Oral Communication Skills:** Students will demonstrate proficiency in communicating in individual dyads and small and large group settings and in appropriate use of grammar to communicate counseling findings, while avoiding sexist language, doublespeak and clichés. Evaluation occurs during the benchmarking process. Students must receive a satisfactory rating from the majority of faculty to earn a satisfactory rating. Faculty will evaluate 100% of the student population.
- **Written Communication:** Students will demonstrate proficiency in academic and scientific writing, which includes avoiding digressions, consistent tenses, using the active voice and citing sources as well as findings, professional documentation, and report writing: with emphasis on APA publishing guidelines.
- **Cultural Self-Awareness and Sensitivity:** Students will demonstrate awareness of self, including knowledge of macro, micro, and meso ecological systems.
- **Cultural Competence:** Students will demonstrate an understanding of the cultural context of relationships, issues, and trends in a multicultural society.
- **Ethical Practice:** Students will demonstrate understanding and application of relevant professional ethical standards.
- **Professionalism:** Students will demonstrate professional maturity, integrity, and discipline consistent with professional standards of practice.

- **Research and Design:** Graduate community counseling students will demonstrate proficiency in designing quantitative, qualitative, single case designs, action, and outcome based research, as well as co-occurring and support software packages (e.g., SPSS). Students will understand ethics surrounding Human Subjects Social and Behavioral Science research procedures and Responsible Conduct in Research.
- **Research Evaluation:** Students will demonstrate proficiency in evaluating empirical and non-empirical research. Students will be able to review the professional literature and glean from the review relevant information for both research and practice. Students will be able evaluate research and its application to field experiences. Students will develop a research paper that reflects their knowledge of this content. The specifics of the research paper along with the grading rubric are presented in the achievement summary.
- **Statistics:** Students will demonstrate proficiency in basic statistics methods including scales of measurement, measures of central tendency, indices of variability, shapes and type of distributions, correlations, reliability and validity. Students will apply supportive software packages (e.g., MS Excel, SPSS).
- **Technological Competence:** Students will demonstrate proficiency in implementing best technology practices.

### **Degree Requirements:**

Total credit hours: 60

- Core courses (18 credits): COUN 702, 713, 736, 740, 750, 770
- Practicum (COUN 784: 3 credits)
- Internship I (COUN 785: 3 credits)
- Internship II (COUN 786: 3 credits)
- Pass comprehensive exam
- Take 18 credits: COUN 707, 758, 759, 760, 763, 766
- Electives: Select 15 credit hours with approval of advisor

### Practicum and Internships

Internships COUN 785 and 786 involve supervised professional experiences in settings appropriate to the student's vocational objectives. The internships will provide practical work in the student's area of specialization. Internships include 600 hours of field experience. Students must complete a minimum of 240 hours of direct services with clients. Each week, students receive one hour of individual supervision from their site supervisors and one and one-half hours group supervision from their university supervisors during seminar. Students in all field experience placements are required to create program-appropriate audio recordings and/or participate in live supervision of their interactions with clients for review by their University Supervisor

### Double major (Mental Health Counseling – Clinical and Mental Health Counseling – Rehabilitation)

Regulations on pursuing double majors are presented elsewhere in the catalog and must be followed. The student will be required to complete requirements of both programs. The programs require the following unique (minimum 18 credit hour requirements):

Mental Health Counseling – Clinical:

COUN 707, 758, 759, 760, 763, 766, 784, 785, 786

Mental Health Counseling – Rehabilitation:

COUN 708, 709, 710, 731, 743, 764, 775, 784, 785, 786

### Double major (Mental Health Counseling – Clinical and School Counseling)

Regulations on pursuing double majors are presented elsewhere in the catalog and must be followed. The student will be required to complete requirements of both programs. The programs require the following unique (minimum 18 credit hour requirements):

Mental Health Counseling – Clinical:  
COUN 707, 758, 759, 784, 785, 786

School Counseling:  
COUN 704, 710, 712, 714, 717, 784, 785, 786

### **Program Specific Academic Policies**

#### Endorsement

The Department stipulates endorsement for employment or credentialing only in the program area in which a student received training.

#### Program Academic Eligibility

A student will be required to maintain semester GPA of at least 3.0 at the end of every semester irrespective of total attempted hours otherwise the student will be placed on probation for one semester. If the semester GPA and/or the cumulative GPA at the end of the probationary semester remains less than 3.0, the student will be dismissed.

A grade of “B” or higher is required in the following courses:  
COUN 702, 707, 708, 710, 712, 713, 736, 740, 750, 760, 770, 784

#### Program Code of Conduct and Ethical Standards of Practice

As pre-professional counselors, graduate students abide by the code of ethics and standards of practice as described in the *Ethical Standards of the American Counseling Association (ACA)*, the *Commission on Rehabilitation Counselor Certification (CRCC)*, *The American Psychological Association*, the *Student Handbook*, the *Graduate Catalog*, and *Department of Human Development and Services Ethical Conduct Policy*.

Consequences of violation of the codes of conduct or ethical standards of practice include but are not limited to one or more of the following:

- Dismissal from the program
- Removal from the course or the field placement and a grade of “F” or “U”
- Referral to authorized campus authorities for further discipline.

#### Program Academic Progression and Retention Standards

The academic progression and retention standards for counselor education programs are in keeping with Council for the Accreditation of Counseling and Related Educational Programs (CACREP) standards, along with the standards set forth by the Council on Rehabilitation Education (CORE), the American Rehabilitation Counseling Association (ARCA), *Ethical Standards of the American Counseling Association (ACA)*, the *Commission on Rehabilitation Counselor Certification (CRCC)*, *The American Psychological Association*, the *Student Handbook*, the *Graduate Catalog*, and *Department of Human Development and Services Ethical Conduct Policy*.

#### The Benchmarking Review Process

Once each academic semester a benchmarking review of all enrolled students is conducted. The benchmarking committee is comprised of all full-time tenured and tenure-track counseling faculty and is chaired by a faculty member. Adjunct faculty members are also invited to attend the benchmarking review.



Reviews are conducted using the Benchmarking Assessment Rubric which focuses on academic performance, ethical behavior, and professional disposition. Each student will be notified in writing by the Department Chairperson regarding the outcome of the benchmarking review and a copy will be placed in the student's file. Students who receive an unsatisfactory evaluation will be placed on probation, provided with a remediation plan and given one semester to implement the remediation plan in order to improve their performance to a satisfactory level. A subsequent unsatisfactory evaluation after the probationary period will result in dismissal from the program.

## Mental Health Counseling – Rehabilitation, MS

College of Education

**Graduate Coordinator:** Glacia Ethridge

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**Phone:** 336-285-4391

**Department Chair:** Tyra Turner Whittaker

**Email:** tnwhitta@ncat.edu

**Phone:** (336) 285-4386

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The Mental Health Counseling - Rehabilitation program is accredited by the Council on Rehabilitation Education (CORE) and is designed to prepare culturally competent counselors who specialize in working with persons with physical, developmental, cognitive, psychological, and neurological disabilities and/or illnesses. Rehabilitation Counseling students are equipped with knowledge, skills, and experience to empower persons with disabilities through the counseling process. Students are further equipped with unique competencies to provide effective rehabilitation counseling services within a cultural context. Students are currently supported on RSA grants in the areas of Vocational Evaluation and Work Adjustment, Rehabilitation Psychology and Behavioral Medicine, and also Behavioral Addiction

### **Additional Admission Requirements**

- Statement of purpose: Describe career goals, research interests and a list of publications, professional and volunteer experience relevant to intended program of study, academic honors and organizations.
- Three professional letters of recommendation from persons who know the applicant in either an academic or supervisory capacity. Letters from family members, acquaintances, and friends are not acceptable
- A current resume or curriculum vita
- Interview: After initial review of all applications, the applicants with greatest potential are also expected to participate in a pre-admission interview with the Counseling faculty. Pre-admission interviews can include: (a) individual interviews, (b) group interaction with observation, and (c) on-site writing sample.

### **Program Outcomes:**

- **Critical Thinking:** Students will develop skills and attitudes of effective thinking that employ the use of thoughtful reflection and logical inquiry to draw evidence-based conclusions as they relate to community counseling.
- **Oral Communication Skills:** Students will demonstrate proficiency in communicating in individual dyads and small and large group settings and in appropriate use of grammar to communicate counseling findings, while avoiding sexist language, doublespeak and clichés. Evaluation occurs during the benchmarking process. Students must receive a satisfactory rating from the majority of faculty to earn a satisfactory rating. Faculty will evaluate 100% of the student population.
- **Written Communication:** Students will demonstrate proficiency in academic and scientific writing, which includes avoiding digressions, consistent tenses, using the active voice and citing sources as well as findings, professional documentation, and report writing: with emphasis on APA publishing guidelines.
- **Cultural Self-Awareness and Sensitivity:** Students will demonstrate awareness of self including knowledge of macro, micro, and meso ecological systems.
- **Cultural Competence:** Students will demonstrate an understanding of the cultural context of relationships, issues, and trends in a multicultural society.
- **Ethical Practice:** Students will demonstrate understanding and application of relevant professional ethical standards.
- **Professionalism:** Students will demonstrate professional maturity, integrity, and discipline consistent with professional standards of practice.
- **Research and Design:** Graduate community counseling students will demonstrate proficiency in designing quantitative, qualitative, single case designs, action, and outcome based research, as well as

co-occurring and support software packages (e.g., SPSS). Students will understand ethics surrounding Human Subjects Social and Behavioral Science research procedures and Responsible Conduct in Research.

- **Research Evaluation:** Students will demonstrate proficiency in evaluating empirical and non-empirical research. Students will be able to review the professional literature and glean from the review relevant information for both research and practice. Students will be able evaluate research and its application to field experiences. Students will develop a research paper that reflects their knowledge of this content. The specifics of the research paper along with the grading rubric are presented in the achievement summary.
- **Statistics:** Students will demonstrate proficiency in basic statistics methods including scales of measurement, measures of central tendency, indices of variability, shapes and type of distributions, correlations, reliability and validity. Students will apply supportive software packages (e.g., MS Excel, SPSS).
- **Technological Competence:** Students will demonstrate proficiency in implementing best technology practices.

#### **Degree Requirements:**

- Core courses (18 credits): COUN 702, 713, 736, 740, 750, 770
- Practicum (COUN 784: 3 credits)
- Internship I (COUN 785: 3 credits)
- Internship II (COUN 786: 3 credits)
- Pass comprehensive exam
- Take 21 credits: COUN 708, 709, 710, 731, 743, 764, 775
- Electives: Select 12 credit hours with approval of advisor

#### Practicum and Internships

Internships COUN 785 and 786 involve supervised professional experiences in settings appropriate to the student's vocational objectives. The internships will provide practical work in the student's area of specialization. Internships include 600 hours of field experience. Students must complete a minimum of 240 hours of direct services with clients. Each week, students receive one hour of individual supervision from their site supervisors and one and one-half hours group supervision from their university supervisors during seminar. Students in all field experience placements are required to create program-appropriate audio recordings and/or participate in live supervision of their interactions with clients for review by their University Supervisor

#### Double major (Mental Health Counseling – Rehabilitation and Mental Health Counseling – Clinical)

Regulations on pursuing double majors are presented elsewhere in the catalog and must be followed. The student will be required to complete requirements of both programs. The programs require the following unique (minimum 18 credit hour requirements):

Mental Health Counseling – Rehabilitation:

COUN 708, 709, 710, 731, 743, 764, 775, 784, 785, 786

Mental Health Counseling – Clinical:

COUN 707, 758, 759, 760, 763, 766, 784, 785, 786

#### Double major (Mental Health – Rehabilitation and School Counseling)

Regulations on pursuing double majors are presented elsewhere in the catalog and must be followed. The student will be required to complete requirements of both programs. The programs require the following unique (minimum 18 credit hour requirements):

Mental Health Counseling – Rehabilitation:  
COUN 708, 709, 731, 743, 764, 775, 784, 785, 786

School Counseling:  
COUN 704, 712, 714, 717, 760, 763, 784, 785, 786

### **Program Specific Academic Policies**

#### Endorsement

The Department stipulates endorsement for employment or credentialing only in the program area in which a student received training.

#### Program Academic Eligibility

A student will be required to maintain semester GPA of at least 3.0 at the end of every semester irrespective of total attempted hours otherwise the student will be placed on probation for one semester. If the semester GPA and/or the cumulative GPA at the end of the probationary semester remains less than 3.0, the student will be dismissed.

#### Program Code of Conduct and Ethical Standards of Practice

As pre-professional counselors, graduate students abide by the code of ethics and standards of practice as described in the *Ethical Standards of the American Counseling Association (ACA)*, the *Commission on Rehabilitation Counselor Certification (CRCC)*, *The American Psychological Association*, the *Student Handbook*, the *Graduate Catalog*, and *Department of Human Development and Services Ethical Conduct Policy*.

Consequences of violation of the codes of conduct or ethical standards of practice include but are not limited to one or more of the following:

- Dismissal from the program
- Removal from the course or the field placement and a grade of “F” or “U”
- Referral to authorized campus authorities for further discipline.

#### Program Academic Progression and Retention Standards

The academic progression and retention standards for counselor education programs are in keeping with Council for the Accreditation of Counseling and Related Educational Programs (CACREP) standards, along with the standards set forth by the Council on Rehabilitation Education (CORE), the American Rehabilitation Counseling Association (ARCA), *Ethical Standards of the American Counseling Association (ACA)*, the *Commission on Rehabilitation Counselor Certification (CRCC)*, *The American Psychological Association*, the *Student Handbook*, the *Graduate Catalog*, and *Department of Human Development and Services Ethical Conduct Policy*.

#### The Benchmarking Review Process

Once each academic semester a benchmarking review of all enrolled students is conducted. The benchmarking committee is comprised of all full-time tenured and tenure-track counseling faculty and is chaired by a faculty member. Adjunct faculty members are also invited to attend the benchmarking review.

Reviews are conducted using the Benchmarking Assessment Rubric which focuses on academic performance, ethical behavior, and professional disposition. Each student will be notified in writing by the Department Chairperson regarding the outcome of the benchmarking review and a copy will be placed in the student’s file. Students who receive an unsatisfactory evaluation will be placed on probation, provided with a remediation plan and given one semester to implement the remediation plan in order to

improve their performance to a satisfactory level. A subsequent unsatisfactory evaluation after the probationary period will result in dismissal from the program.

## Nanoengineering, MS

Joint School of Nanoscience and Nanoengineering

**Graduate Coordinator:** Lifeng Zhang

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**Department Chair:** Ajit Kelkar

**Email:** kelkar@ncat.edu

**Phone:** 336-285-2864

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The Master of Science in Nanoengineering degree program is a research master's degree, featuring coursework involving engineering at the nanoscale. It is designed for students with a strong background in engineering or applied science who seek additional, specialized training for industrial or government positions in fields that utilize nanotechnology. Students will have the opportunity to work in one or more of the following research areas: nanobiology, nanomaterials, nanometrology, nanobioelectronics, nanoenergy, and computational nanotechnology.

### **Additional Admission Requirements**

- Bachelor's degree in engineering or a closely related field
- Two of the three recommendation letters must be from University faculty members
- Current curriculum vitae

### **Degree Requirements**

Total credit hours: 30

- Core courses (15 credits): NANO 701, 702, 703, 704, 705

#### Thesis option:

- Select 9 credit hours from NANO 711, 721, 731, 741, 761, 790
- Thesis (NANO 797: 6 credits)
- Participate in all JSNN Seminars
- Pass thesis defense

#### Project Option:

- Select 12 credit hours from NANO 711, 721, 731, 741, 761, 790
- Project (NANO 796: 3 credits)
- Participate in all JSNN Seminars

## Nanoengineering, PhD

Joint School of Nanoscience and Nanoengineering

**Graduate Coordinator:** Lifeng Zheng

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**Department Chair:** Ajit Kelkar

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**Phone:** 336-285-2864

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The Ph.D. program in Nanoengineering features coursework, laboratory rotations and extensive dissertation research involving engineering at the nanoscale. It is designed for students with a strong academic track record who seek advanced-level education and training to pursue careers in academia, industrial or government organization that utilize nanotechnology. Students will have the opportunity to work in one or more of the following research areas: nanobiology, nanomaterials, nanometrology, nanobioelectronics, nanoenergy, and computational nanotechnology.

### Additional Admission Requirements

- Bachelor's degree in engineering or a closely related field with minimum 3.5 GPA or master's degree in engineering or a closely related field
- GRE scores
- Two of the three recommendation letters must be from University faculty members
- Current curriculum vitae

### Degree Requirements

Total credit hours: 60 (post baccalaureate)

- Core courses (15 credits): NANO 701, 702, 703, 704, 705
- Lab Rotations: Select 3 credit hours from: NANO 851, 852, 853, 854, 855, 856 or consortium course NAN 611 (UNCG)
- Select 9 credit hours from: NANO 771, 811, 814, 812, 821, 823, 825, 827, 831, 841, 861, 871, 885, 990 or consortium courses NAN 700-798 (UNCG) or other 800 level courses with approval of the advisor and graduate coordinator/department chair
- Select 9 credit hours from: NANO 711, 721, 731, 741, 811, 812, 821, 823, 825, 827, 831, 841, 861, 885, 990 or consortium courses NAN 600-798 (UNCG) excluding NAN 621, 622, 628 or other courses with approval of the advisor and graduate coordinator/department chair
- Supervised Research (6 credits): NANO 994
- Teach at least one semester
- Dissertation (18 credits): NANO 997
- Pass qualifying exam, preliminary exam, dissertation defense
- Attend all JSNN seminars

### Qualifying Examination:

The Qualifying Examination is given to assess student competence in a broad range of relevant subject areas. The Qualifying Examination is given once each semester (Fall and Spring) and it is held on two consecutive days. Only students with unconditional status and in good academic standing may take the Qualifying Examination. Students must take the Qualifying Examination by the end of the second semester of enrollment. In case of failure to pass in this first attempt, students will have the opportunity to take the exam in the following semester. Failure to pass the Qualifying Examination by the end of the third enrolled semester or the second attempt will result in the termination from the program.

### Preliminary Oral Examination:

The Preliminary Oral Examination is conducted by the student's dissertation committee and is a defense of the student's dissertation proposal. Students must have successfully completed the qualifying examination to be eligible for the Preliminary Oral Examination. Passing this exam satisfies requirements

for Ph.D. Candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Admission to Ph.D. Candidacy**

A student will be admitted to candidacy upon successful completion of the Qualifying Examination and Preliminary Oral Examination.

**Dissertation Research:**

A student may not register for dissertation credits before passing Qualifying Examination. No more than 18 dissertation credits are counted toward the total credit hours requirement for the degree.

**Final Oral Dissertation Defense:**

The Final Oral Dissertation Defense is conducted by the student's dissertation committee. This examination is the final dissertation defense presentation that is scheduled after a dissertation is completed. The examination may be held no earlier than six months after admission to candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

**Submission of Dissertation:**

Upon passing the Ph.D. Final Oral Dissertation Defense, the Ph.D. student must have the dissertation approved by each member of the student's dissertation committee. The approved dissertation must be submitted to The Graduate College by the deadline given in the academic calendar, and must conform to the Graduate College's guidelines for theses and dissertations.

**Program Specific Academic Policies:**

- The qualifying exam must be attempted for the 1<sup>st</sup> time by the end of the 2<sup>nd</sup> semester and must be passed by the end of the 3<sup>rd</sup> semester.
- Assist the instructor in teaching a course or laboratory for at least 1 semester.



## Physics, MS

College of Science and Technology

**Graduate Coordinator:** Ashot Gasparian

**Email:** agaspari@ncat.edu

**Phone:** 336-285-2112

**Department Chair:** Floyd James

**Email:** fjames@ncat.edu

**Phone:** 336-285-2114

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The Masters of Science program in Physics prepares students for professional careers in industrial and governmental research, developmental applications of physics, teaching, and further study toward a Ph.D. in physics. Physics Masters are trained to use their advanced knowledge and analytical skills to solve complex problems in industry and research labs. Experimental Low and Medium Energy Physics, Atmospheric Science, Chemical Physics, Physics Education, Seismic Data Processing, Computational Atomic Molecular and Optical Physics. Opportunities to collaborate exist with major research institutions such as Duke University, the University of North Carolina at Chapel Hill, North Carolina State University, Wake Forest University, Stanford University, Pennsylvania State University, Hampton University, the University of Virginia and others. Collaborations with national laboratories include the Thomas Jefferson National Accelerator Facility (JLab), NOAA-Earth System Research Laboratory (NOAA-ESRL), Lawrence Berkeley National Laboratory (LBNL), National High Magnetic Field Lab-Florida, Los Alamos National Laboratory (LANL), and Oak Ridge National Laboratory (ORNL). International collaborations include the University of Marseilles in France, the Addis Ababa University in Ethiopia, ITEF Moscow, Russia, and the Institute for High Energy Physics at Protvino, Russia.

### Additional Admission Requirements

- An undergraduate degree in physics or its equivalent
- Applicant's background reflects maturity in physics from junior and senior level undergraduate courses in classical mechanics, electromagnetism, thermodynamics and statistical mechanics, and quantum physics

### Program Outcomes

- **Critical Thinking:** Students at the MS-Physics program will be able to think critically and use relevant physics concepts to solve physics problems and analyze situations involving physics.
- **Communication:** MS-Physics students will be able to articulate physical concepts, research work, and findings with tact and professionalism, both orally and in writing.
- **General Physics Knowledge and Analytical Reasoning:** Students will acquire an in-depth knowledge and thorough understanding of physical principles. Students will develop analytical skills to combine them with their working knowledge to explain the world around us and how things work at the fundamental level.
- **Physics Specialty Expertise:** Students will develop a physics specialty area of expertise through course work and research.
- **Scientific Methodology:** Students will develop an understanding of scientific methodology, through data collection from observations, setting up laboratory experiments and data acquisition, data analysis, data interpretation and testing of model/hypothesis, and reporting of data.
- **Computer and Computational Expertise:** MS-Physics students will develop competency in using computers and computational methods through:
  1. use or write software code to acquire/analyze/visualize data
  2. data analysis
  3. computer simulations

### Degree Requirements

Total credit hours: 30

- Core courses (12 credits): PHYS 600, 615, 620, 630

Thesis option:

- Take 12 credits of additional PHYS or technical electives with approval of advisor
- Thesis (PHYS 797: 6 credits)
- Pass thesis defense

Project Option:

- Take 15 credits of additional PHYS or technical electives courses with approval of advisor
- Project (PHYS 796: 3 credits)

Course Option:

- Take 18 credits of additional PHYS or EES courses with approval of advisor

## Reading Education K-12, MAEd

College of Education

**Graduate Coordinator:** Nichole Smith

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**Department Chair:** Loury Floyd

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The Master of Arts in Education, Reading Education degree program prepares highly-qualified reading specialists for K-12 students. Through courses in literacy and language development, diagnostic and prescriptive reading, and assessment and literacy instruction, candidates in the Master of Arts in Education, Reading Education program develop knowledge, skills, dispositions, and professional attitudes that empower them to become lifelong learners and exemplary educational leaders inside and outside K-12 learning contexts. The MAEd program in Reading Education is aligned with professional standards commensurate with the Interstate Teacher Assessment and Support Consortium (InTASC), the National Council for the Accreditation of Teacher Education (NCATE), the North Carolina Department of Public Instruction (NCDPI), and National Board Professional Teaching Standards (NBPTS). The Master of Arts in Education (MAEd) program in Reading Education is an accredited program by the National Council for the Accreditation of Teacher Education (NCATE) and by the North Carolina Department of Public Instruction (NCDPI).

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability to register for certain required courses. Applicants and current students should review licensure requirements at <http://www.ncat.edu/academics/schools-colleges1/soe/teacher-education/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- Graduate Record Examination (GRE) Scores
- Standard Professional 1 or 2 NC Teaching License
- Statement of Purpose

### Program Outcomes:

Candidates in the MAED Reading Education program will: (1) demonstrate effective research writing skills appropriate for educational scholars, (2) demonstrate effective knowledge, skills, and attitudes in diversity issues, learning theories, technological skills, and methods of instruction, (3) demonstrate the ability to implement research-based reading strategies supported by learning theories and aligned to the North Carolina Common Core and Essential Standards with K-12 students, and (4) demonstrate their depth of literacy knowledge and breadth of literacy pedagogical skills with K-12 students from diverse backgrounds.

### Degree Requirements:

Total credit hours: 30

- Core Courses (9 credit hours): CUIN 711, 729, 755
- Take 21 credits: READ 735, 736, 738, 756, 757, 774; ELED 751

Prior to beginning Phase II, candidates must have: (1) a Planning Contract on file with the program coordinator, (2) a minimum 3.00 Grade Point Average, and (3) passing scores on the core comprehensive examination.

**Phase II**

- Take 24 credit hours: READ 735, 736, 737, 738, 756, 757, 759, 774; ELED 789

Up to six credit hours may be waived for students who have National Board certification.

## Rehabilitation Counseling and Counselor Education, PhD

College of Education

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The Doctoral Program in Rehabilitation Counseling and Counselor Education is designed to prepare culturally competent students to work as counselor educators, researchers, clinicians, and supervisors in academic and non-academic settings. In addition to establishing a core foundation in rehabilitation counseling and research, major emphasis is provided in the area of Trauma and Trauma Informed Care. The primary educational objectives of the program are: a) to increase students' knowledge of the role and functions of rehabilitation counselor educators, researchers, and counselors, b) to equip students with unique counseling and research skills to provide effective rehabilitation counseling, education, and research within a cultural context, c) to prepare students to obtain content knowledge in cultural diversity, trauma informed care, and additional expertise in specific areas in rehabilitation education, d) to equip students with knowledge, skills, and experiences to increase the body of research addressing diversity, social justice, and disability issues, and e) to prepare students to address professional issues and become leaders and researchers in rehabilitation counselor education and disability research through professional associations, publications, and professional development.

### Additional Admission Requirements

- Master's in Rehabilitation Counseling (CORE), or Counseling (CACREP), or a related profession with overall GPA of 3.5 or higher
- GRE Score
- Two years of work experience preferred
- Statement of purpose: Describe career goals, research interests and a list of publications, professional and volunteer experience relevant to intended program of study, academic honors and organizations.
- Three professional letters of recommendation must include letters from professor(s) from Master's program and from supervisor(s) from professional settings
- A current resume or curriculum vita
- Licensure and/or certification documentation
- Submission of a 10-12 page writing sample
- Interview: After initial review of all applications, the applicants with greatest potential are also expected to participate in a pre-admission interview with the Counseling faculty. Pre-admission interviews can include: (a) individual interviews, (b) group interaction with observation, and (c) on-site writing sample.

### Program Outcomes

- **Critical Thinking:** Students will develop skills and attitudes of effective thinking that employ the use of thoughtful reflection and logical inquiry to draw evidence-based conclusions as they relate to community counseling.
- **Oral Communication Skills:** Students will demonstrate proficiency in communicating in individual dyads and small and large group settings and in appropriate use of grammar to communicate counseling findings, while avoiding sexist language, doublespeak and clichés. Evaluation occurs during the benchmarking process. Students must receive a satisfactory rating from the majority of faculty to earn a satisfactory rating. Faculty will evaluate 100% of the student population.
- **Written Communication:** Students will demonstrate proficiency in academic and scientific writing, which includes avoiding digressions, consistent tenses, using the active voice and citing sources as well as findings, professional documentation, and report writing: with emphasis on APA publishing guidelines.

- **Cultural Self-Awareness and Sensitivity:** Students will demonstrate awareness of self, including knowledge of macro, micro, and meso ecological systems.
- **Cultural Competence:** Students will demonstrate an understanding of the cultural context of relationships, issues, and trends in a multicultural society.
- **Ethical Practice:** Students will demonstrate understanding and application of relevant professional ethical standards.
- **Professionalism:** Students will demonstrate professional maturity, integrity, and discipline consistent with professional standards of practice.
- **Research and Design:** Graduate community counseling students will demonstrate proficiency in designing quantitative, qualitative, single case designs, action, and outcome based research, as well as co-occurring and support software packages (e.g., SPSS). Students will understand ethics surrounding Human Subjects Social and Behavioral Science research procedures and Responsible Conduct in Research.
- **Research Evaluation:** Students will demonstrate proficiency in evaluating empirical and non-empirical research. Students will be able to review the professional literature and glean from the review relevant information for both research and practice. Students will be able evaluate research and its application to field experiences. Students will develop a research paper that reflects their knowledge of this content. The specifics of the research paper along with the grading rubric are presented in the achievement summary.
- **Statistics:** Students will demonstrate proficiency in basic statistics methods including scales of measurement, measures of central tendency, indices of variability, shapes and type of distributions, correlations, reliability and validity. Students will apply supportive software packages (e.g., MS Excel, SPSS).
- **Technological Competence:** Students will demonstrate proficiency in implementing best technology practices.

### **Degree Requirements**

Total credit hours: 63 (post-master's)

- Take Core courses (27 credits): COUN 800, 802, 812, 818, 825, 850, 860, 880, 989
- Statistics Core courses (15 credit hours): COUN 810, 815, 830, 865, 870
- Field experience (9 credit hours): COUN 984, 985, 986
- Dissertation (12 credits): COUN 997
- Pass qualifying exam, preliminary exam, dissertation defense

### **Dissertation Research:**

A student may not register for dissertation credits before passing Qualifying Examination. No more than 12 dissertation credits are counted toward the total credit hours requirement for the degree.

### **Qualifying Examination:**

The Qualifying Examination is given to assess the student's competence in a broad range of relevant subject areas. Only students with unconditional status and in good academic standing may take the Qualifying Examination. A student who wants to retake the Qualifying Examination must apply to retake the Qualifying Examination by the posted deadline. No student is permitted to take the Qualifying Examination more than twice. A student not recommended for re-examination or who fails the exam on a second attempt may be dismissed from the doctoral program.

### **Preliminary Oral Examination:**

The Preliminary Oral Examination is conducted by the student's dissertation committee and is a defense of the student's dissertation proposal. Passing this exam satisfies requirements for Ph.D. Candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee

may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

### **Admission to Candidacy**

Student will be admitted to candidacy upon successful completion of the Qualifying Exam and the Preliminary oral Exam.

### **Final Oral Examination:**

The Final Oral Examination is conducted by the student's dissertation committee. This examination is the final dissertation defense presentation that is scheduled after a dissertation is completed. The examination may be held no earlier than one semester (or four months) after admission to candidacy. Failure on the examination may result in dismissal from the doctoral program. The student's Advisory Committee may permit one re-examination. At least one full semester must elapse before the re-examination. Failure on the second attempt will result in dismissal from the doctoral program.

### **Submission of Dissertation:**

Upon passing the Ph.D. Final Oral Examination, the Ph.D. student must have the dissertation approved by each member of the student's dissertation committee. The approved dissertation must be submitted to The Graduate College by the deadline given in the academic calendar, and must conform to the Graduate College's guidelines for theses and dissertations.

### **Program Specific Academic Policies**

#### Endorsement

The Department stipulates endorsement for employment or credentialing only in the program area in which a student received training.

#### Program Academic Eligibility

A student will be required to maintain semester GPA of at least 3.0 at the end of every semester irrespective of total attempted hours otherwise the student will be placed on probation for one semester. If the semester GPA and/or the cumulative GPA at the end of the probationary semester remains less than 3.0, the student will be dismissed.

#### Program Code of Conduct and Ethical Standards of Practice

As pre-professional counselors, graduate students abide by the code of ethics and standards of practice as described in the *Ethical Standards of the American Counseling Association (ACA)*, the *Commission on Rehabilitation Counselor Certification (CRCC)*, *The American Psychological Association*, the *Student Handbook*, the *Graduate Catalog*, and *Department of Human Development and Services Ethical Conduct Policy*.

Consequences of violation of the codes of conduct or ethical standards of practice include but are not limited to one or more of the following:

- Dismissal from the program
- Removal from the course or the field placement and a grade of "F" or "U"
- Referral to authorized campus authorities for further discipline.

#### Program Academic Progression and Retention Standards

The academic progression and retention standards for counselor education programs are in keeping with Council for the Accreditation of Counseling and Related Educational Programs (CACREP) standards, along with the standards set forth by the Council on Rehabilitation Education (CORE), the American Rehabilitation Counseling Association (ARCA), *Ethical Standards of the American Counseling Association (ACA)*, the *Commission on Rehabilitation Counselor Certification (CRCC)*, *The American*

*Psychological Association, the Student Handbook, the Graduate Catalog, and Department of Human Development and Services Ethical Conduct Policy.*

#### The Benchmarking Review Process

Once each academic semester a benchmarking review of all enrolled students is conducted. The benchmarking committee is comprised of all full-time tenured and tenure-track counseling faculty and is chaired by a faculty member. Adjunct faculty members are also invited to attend the benchmarking review.

Reviews are conducted using the Benchmarking Assessment Rubric which focuses on academic performance, ethical behavior, and professional disposition. Each student will be notified in writing by the Department Chairperson regarding the outcome of the benchmarking review and a copy will be placed in the student's file. Students who receive an unsatisfactory evaluation will be placed on probation, provided with a remediation plan and given one semester to implement the remediation plan in order to improve their performance to a satisfactory level. A subsequent unsatisfactory evaluation after the probationary period will result in dismissal from the program.



## School Administration, MSA

College of Education

**Graduate Coordinator:** Loury Floyd

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The Master of School Administration (MSA) program is designed to prepare school executives to assume leadership roles in schools and school systems, primarily as superintendents, central office administrators, principals and assistant principals. Graduates of School Administration program are eligible for licensure from the North Carolina State Department of Public Instruction (SDPI) and may be qualified for administration certification in other states. Students who meet the NC Principal Fellows criteria, and who are interested in full time study and full time internship may apply to the NC Principal Fellows Program for full tuition and stipend to enroll in the MSA program. Program content is aligned with the North Carolina Standards for School Executives, the Interstate School Leaders Licensure Consortium standards for school leaders (ISLLC), the Educational Leadership Constituent Council (ELCC), and the National Council for Accreditation of Teacher Education (NCATE) for advanced programs in educational leadership.

### **Additional Admission Requirements**

- Three years of successful teaching experiences (or educational-related experience).
- Two years of Adult Leadership experience ( e.g. department chair, grade-level chair)
- NC Standard II Professional License
- Three official letters of recommendation, signed and sealed by the writer. One of the letters must be from current administrator (e.g. principal or assistant principal).
- Faculty Interview
- Electronic portfolio that includes evidence in the following areas:
  - Support for all students achieving high standards of learning
  - Accomplished classroom instruction which shall include data providing evidence of two years of student growth and learning within the last 5 years
  - Significant leadership roles in past positions
  - Strong oral and written communication skills
  - Analytic abilities needed to collect and analyze data for student improvements
  - Demonstrated respect for family and community
  - Strong interpersonal skills
  - Knowledge of curriculum and instructional practices
- Written Statements -- please see College of Education website for writing prompts.
- A copy of most recent NC Teacher Evaluation (or its equivalent) with at least a minimum rating of Proficient in all standards.
- Current resume

### **Degree Requirements**

Total credit hours: 30

- Core courses (18 credits): MSA 770, 771, 774, 776, 778, 765
- Internship Supervision I (MSAL 784: 6 credits)
- Internship Supervision II (MSAL 785: 6 credits)
- Pass comprehensive exam
- Earn a minimum rating of proficient on NCDPI ( North Carolina Department of Public Instruction ) School Executives Evidences

## School Counseling, MS

College of Education

**Graduate Coordinator:** Angel Dowden

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**Department Chair:** Tyra Turner Whitaker

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The School Counseling program is designed for individuals seeking a professional career in elementary or secondary school counseling. The School Counseling program is a flexible and high quality evening program which offers students the opportunity to create an individualized rate of matriculation in either part-time or full-time enrollment. The School Counseling program is nationally accredited by the Council on the Accreditation of Counseling and Related Educational Programs (CACREP). Curricular experiences encompasses each of CACREP's eight core areas of professional counseling which include Professional Identity, Social and Cultural Diversity, Human Growth and Development, Career Development, Helping Relationships, Group Work, Assessment, and Research and Program Evaluation. Students are prepared to take the PRAXIS II Specialty test in School Guidance and Counseling and the National Counseling Examination (NCE) of the National Board for Certified Counselors (NBCC) which is administered twice annually at NCA&T and apply for licensure as a licensed professional counselor through the North Carolina Board of Licensed Professional Counselors upon completion of the program. Students who pass the NCE prior to graduation are recognized as board eligible by NBCC.

**Teacher Education Licensure:** Completing this master's degree and obtaining a teaching license are separate processes. Admission to this master's program does not guarantee admission to the Teacher Education Licensure program. To be recommended for licensure, candidates must first be formally admitted to the Teacher Education Licensure Program. Failure to complete the Teacher Education admission requirements during the first semester of enrollment may result in the student's inability register for certain required courses. Applicants and current students should review licensure requirements at <http://www.ncat.edu/academics/schools-colleges1/soe/teacher-education/index.html> or visit the School of Education for guidance on specific requirements.

### Additional Admission Requirements

- Statement of purpose: Describe career goals, research interests and a list of publications, professional and volunteer experience relevant to intended program of study, academic honors and organizations.
- Three professional letters of recommendation from persons who know the applicant in either an academic or supervisory capacity. Letters from family members, acquaintances, and friends are not acceptable
- A current resume or curriculum vita
- Interview: After initial review of all applications, the applicants with greatest potential are also expected to participate in a pre-admission interview with the Counseling faculty. Pre-admission interviews can include: (a) individual interviews, (b) group interaction with observation, and (c) on-site writing sample.

### Program Outcomes

- Research Evaluation: Students will demonstrate proficiency in evaluating empirical and non-empirical research. Students will be able to review the professional literature and glean from the review relevant information for both research and practice. Students will be able evaluate research and its application to field experiences. Students will develop a research paper that reflects their knowledge of this content. The specifics of the research paper along with the grading rubric are presented in the achievement summary.
- Research and Design: Graduate community counseling students will demonstrate proficiency in designing quantitative, qualitative, single case designs, action, and outcome based research, as well as co-occurring and support software packages (e.g., SPSS). Students will understand ethics surrounding

Human Subjects Social and Behavioral Science research procedures and Responsible Conduct in Research.

- **Statistics:** Students will demonstrate proficiency in basic statistics methods including scales of measurement, measures of central tendency, indices of variability, shapes and type of distributions, correlations, reliability and validity. Students will understand the use and availability of supportive software packages (e.g., MS Excel, SPSS).
- **Oral Communication Skills:** Students will demonstrate proficiency in communicating in individual dyads and small and large group settings.
- **Written Communication:** Students will demonstrate proficiency in academic and scientific writing, professional documentation, and report writing: with emphasis on APA publishing guidelines.
- **Cultural Awareness and Sensitivity:** Students will demonstrate awareness of self, including knowledge of macro, micro, and meso ecological systems.
- **Cultural Competence:** Students will demonstrate an understanding of the cultural context of relationships, issues, and trends in a multicultural society.
- **Ethical Practice:** Students will demonstrate understanding and application of relevant professional ethical standards.
- **Professionalism:** Students will demonstrate professional maturity, integrity, and discipline consistent with professional standards of practice.
- **Technological Competence:** Students will demonstrate proficiency in implementing best technology practices.

### **Degree Requirements:**

Total credit hours: 60

- Core courses (18 credits): COUN 702, 713, 736, 740, 750, 770
- Take 21 credits: COUN 704, 710, 712, 714, 717, 760, 763
- Electives: Select 12 credit hours with approval of advisor
- Practicum (COUN 784: 3 credits)
- Internship I (COUN 785: 3 credits)
- Internship II (COUN 786: 3 credits)
- Pass comprehensive exam

### Practicum and Internships

Internships COUN 785 and 786 involve supervised professional experiences in settings appropriate to the student's vocational objectives. The internships will provide practical work in the student's area of specialization. Internships include 600 hours of field experience. Students must complete a minimum of 240 hours of direct services with clients. Each week, students receive one hour of individual supervision from their site supervisors and one and one-half hours group supervision from their university supervisors during seminar. Students in all field experience placements are required to create program-appropriate audio recordings and/or participate in live supervision of their interactions with clients for review by their University Supervisor

### Double major (School Counseling and Mental Health Counseling – Clinical)

Regulations on pursuing double majors are presented elsewhere in the catalog and must be followed. The student will be required to complete requirements of both programs. The programs require the following unique (minimum 18 credit hour requirements):

School Counseling:

COUN 704, 710, 712, 714, 717, 784, 785, 786

Mental Health Counseling – Clinical:

COUN 707, 758, 759, 784, 785, 786

Double major (School Counseling and Mental Health – Rehabilitation)

Regulations on pursuing double majors are presented elsewhere in the catalog and must be followed. The student will be required to complete requirements of both programs. The programs require the following unique (minimum 18 credit hour requirements):

School Counseling:

COUN 704, 712, 714, 717, 760, 763, 784, 785, 786

Mental Health Counseling – Rehabilitation:

COUN 708, 709, 731, 743, 764, 775, 784, 785, 786

**Licensure**

The student who has completed all requirements for graduation will also be eligible to apply for state certification/licensure in School Counseling by taking the PRAXIS II Specialty test in School Guidance and Counseling. Students are also eligible to become Nationally Certified Counselors by taking the National Counselor Examination offered by the National Board of Certified Counselors prior to graduation. In addition, the North Carolina Board for Licensed Professional Counselors recognizes this exam as their licensure exam. Student pursuing a licensure in School Counseling must take the PRAXIS II Specialty test in School Guidance and Counseling. Scores needed to pass: Specialty Area Exam (School Guidance and Counseling) 570. For further information consult the PRAXIS Booklet or the School of Education Dean’s Office, 380 Proctor Hall, (336) 334-7757 or visit the PRAXIS II website.

**Program Specific Academic Policies**

Endorsement

The Department stipulates endorsement for employment or credentialing only in the program area in which a student received training.

Program Academic Eligibility

A student will be required to maintain semester GPA of at least 3.0 at the end of every semester irrespective of total attempted hours otherwise the student will be placed on probation for one semester. If the semester GPA and/or the cumulative GPA at the end of the probationary semester remains less than 3.0, the student will be dismissed.

Program Code of Conduct and Ethical Standards of Practice

As pre-professional counselors, graduate students abide by the code of ethics and standards of practice as described in the *Ethical Standards of the American Counseling Association (ACA)*, the *Commission on Rehabilitation Counselor Certification (CRCC)*, *The American Psychological Association*, the *Student Handbook*, the *Graduate Catalog*, and *Department of Human Development and Services Ethical Conduct Policy*.

Consequences of violation of the codes of conduct or ethical standards of practice include but are not limited to one or more of the following:

- Dismissal from the program
- Removal from the course or the field placement and a grade of “F” or “U”
- Referral to authorized campus authorities for further discipline.

Program Academic Progression and Retention Standards

The academic progression and retention standards for counselor education programs are in keeping with Council for the Accreditation of Counseling and Related Educational Programs (CACREP) standards,

along with the standards set forth by the Council on Rehabilitation Education (CORE), the American Rehabilitation Counseling Association (ARCA), *Ethical Standards of the American Counseling Association (ACA)*, the *Commission on Rehabilitation Counselor Certification (CRCC)*, *The American Psychological Association*, the *Student Handbook*, the *Graduate Catalog*, and *Department of Human Development and Services Ethical Conduct Policy*.

#### The Benchmarking Review Process

Once each academic semester a benchmarking review of all enrolled students is conducted. The benchmarking committee is comprised of all full-time tenured and tenure-track counseling faculty and is chaired by a faculty member. Adjunct faculty members are also invited to attend the benchmarking review.

Reviews are conducted using the Benchmarking Assessment Rubric which focuses on academic performance, ethical behavior, and professional disposition. Each student will be notified in writing by the Department Chairperson regarding the outcome of the benchmarking review and a copy will be placed in the student's file. Students who receive an unsatisfactory evaluation will be placed on probation, provided with a remediation plan and given one semester to implement the remediation plan in order to improve their performance to a satisfactory level. A subsequent unsatisfactory evaluation after the probationary period will result in dismissal from the program.

## Social Work (Joint with UNCG), MSW

College of Health and Human Sciences

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**Department Chair:** Arnold Barnes

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The Joint Master of Social Work (MSW) program represents the efforts of faculty at North Carolina Agricultural and Technical State University (NCA&TSU) and The University of North Carolina at Greensboro (UNCG). This is a single academic program with participation in instruction by faculty from each department. Instruction is conducted on the campuses of both universities. The program is accredited by The Council on Social Work Education and the curriculum has been designed by the joint faculty to provide students with a multicultural clinical social work education. The model for the curriculum is based on CSWE social work competencies, and contemporary, state-of-the-art theory and practice methods. The curriculum is organized by generalist year, concentration year, and field instruction. The primary purpose of the MSW program is to prepare students for multicultural clinical social work practice.

### Additional Admission Requirements

- Evidence of a liberal arts foundation to include the following minimum 30 credit hours: 18 Social and Behavioral Sciences (Political Science, Psychology, Anthropology, Economics, Ethnic/Global Studies, History, and Sociology); 6 Humanities; 3 Human Biology or Human Development; 3 Statistics
- Applicants must demonstrate intellectual and personal qualifications considered essential to the successful practice of social work, such as sensitivity and responsiveness in relationships, concern for the need of others, adaptability, good judgment, creativity, integrity, and skill in oral and written communication. This determination shall be based on a review of the applicant's references and written personal statement.
- Applicants to the Advanced Standing plan of study must have earned a Bachelor of Social Work degree from a Council on Social Work Education accredited program, have a GPA in social work courses of 3.2 or better, and provide a letter of recommendation from his/her B.S.W. field supervisor (as one of the three recommendations required).

### Program Outcomes

The JMSW Program's competency-based curriculum has been designed to comply with the Council on Social Work Education's (CSWE) Educational Policy and Accreditation Standards (EPAS), as revised in 2015. CSWE has delineated 9 core competencies, listed below, that must be adequately addressed in all BSW and MSW curricula.

- Competency 1: Demonstrate Ethical and Professional Behavior
- Competency 2: Engage Diversity and Difference in Practice
- Competency 3: Advance Human Rights and Social, Economic, and Environmental Justice
- Competency 4: Engage in Practice-informed Research and Research-informed Practice
- Competency 5: Engage in Policy Practice
- Competency 6: Engage with Individuals, Families, Groups, Organizations, and Communities
- Competency 7: Assess Individuals, Families, Groups, Organizations, and Communities
- Competency 8: Intervene with Individuals, Families, Groups, Organizations, and Communities
- Competency 9: Evaluate Practice with Individuals, Families, Groups, Organizations, and Communities

### Degree Requirements

Total credit hours: 60 (two year and three year options), 42 (advanced standing option)

#### Two year option

- Generalist Courses: Take 30 credit hours: SOWK 609, 618, 619, 621, 622, 623, 624, 626, 784, 785
- Concentration Courses: Take 24 credit hours: SOWK 634, 644, 652, 653, 786, 787, 789, 792
- Electives: Select 6 credit hours: SOWK 600-799

Advanced standing option

Requires full time enrollment by students with Bachelor of Social Work Degrees.

- Summer Bridge/Transition Courses: Take 12 credit hours: SOWK 623, 624, 626, 631
- Take 12 credit hours: SOWK 634, 644, 652, 653
- Take 12 credit hours: 786, 787, 789, 792
- Electives: Select 6 credit hours from: SOWK 600-799

**Internships**

The JMSW Field Instruction Program provides directed learning opportunities through social work internships. Upon completion of the of field instruction program, two year students will have a total of 1,008 hours in field internships. Advanced Standing students will have to complete a total of 672 hours.

## Technology Management, MS

College of Science and Technology

**Graduate Coordinator:** Mahour Mellat Parast **Email:** mahour@ncat.edu

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**Department Chair:** Aixi Zhou

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**Phone:** 336-285-3158

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The Association of Technology, Management, and Applied Engineering (ATMAE) defines Technology Management as the field concerned with the supervision of personnel across the technical spectrum and a wide variety of complex technological systems. There is an increasing demand for experienced professionals who can play leadership roles involving technology innovation; development and deployment of new technologies across a broad spectrum of industries; planning, problem solving, and decision-making to improve business performance.

### Program Outcomes

- **Communication:** During the coursework in the program, students will be able to communicate effectively the functions performed by Technology professionals in the installation, design, and utilization of software applications and equipment with the clarity and precision required by standards commonly practiced in the profession.
- **Critical Thinking:** During the coursework in the program, students will be able to define technological requirements appropriate to commonly encountered problems and solutions in workplace/enterprise.
- **Innovation:** During the coursework in the program, students will be able to design and implement a project that meets the desired technical specification, process, component, and/or program.
- **Global Awareness - Social Responsibility:** During the coursework in the program, students will be able to analyze the impact of Technology, both locally and globally, on individuals, organizations, and society.
- **Ethical Leadership:** During the coursework in the program, students will be able to understand the professional, legal, security, and social issues and responsibilities of the technologist professions engaged in developing innovative projects/systems solutions that address specific issues.

### Degree Requirements

Total credit hours: 30

- Core courses (9 credit hours): MSTM 701, 703, 704

#### Thesis option

- Select 15 credits from AET, CM, ECT, GCS, ITT, OSH, TECH with approval of advisor
- Thesis (6 credits): MSTM 797
- Pass thesis defense

#### Non-thesis option

- Select 21 credits from AET, CM, ECT, GCS, ITT, OSH, TECH with approval of advisor



## Technology Management – Construction Science and Management PSM, MS

College of Science and Technology

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**Department Chair:** Aixi Zhou

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The Construction Science and Management Professional Science Masters concentration is designed to prepare professionals to take leadership roles in the construction industry.

### Program Outcomes

- **Communication:** During the coursework in the program, students will be able to communicate effectively the functions performed by Technology professionals in the installation, design, and utilization of software applications and equipment with the clarity and precision required by standards commonly practiced in the profession.
- **Critical Thinking:** During the coursework in the program, students will be able to define technological requirements appropriate to commonly encountered problems and solutions in workplace/enterprise.
- **Innovation:** During the coursework in the program, students will be able to design and implement a project that meets the desired technical specification, process, component, and/or program.
- **Global Awareness - Social Responsibility:** During the coursework in the program, students will be able to analyze the impact of Technology, both locally and globally, on individuals, organizations, and society.
- **Ethical Leadership:** During the coursework in the program, students will be able to understand the professional, legal, security, and social issues and responsibilities of the technologist professions engaged in developing innovative projects/systems solutions that address specific issues.

### Degree Requirements

Total credit hours: 30

- Core courses (9 credit hours): MSTM 701, 703, 704
- Disciplinary Electives: Take 12 credit hours from: CM 679, 708, 710; LAND 682
- Business/management Electives: Select 6 credit hours from: CM 692, 764, 768; MGMT 712
- Take 3 credits from: Project: MSTM 784, 796

## Certificate – Advanced Waste Management, PB

College of Agriculture and Environmental Sciences

**Graduate Coordinator:** Godfrey A. Uzochukwu **Email:** uzo@ncat.edu

**Phone:** 336-334-7030

**Department Chair:** Abolghasem Shahbazi **Email:** ash@ncat.edu

**Phone:** 336- 285- 4851

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The advanced interdisciplinary waste management certificate program is open to all graduate students. It is designed to create a talented pool of advanced students who will become leaders in environmental and waste management fields.

### **Program Requirements**

Total credit hours: 12

- Capstone: Select 1 credit hour: WMI 747 (1 credit hour capstone)
- Select 5 credit hours from: WMI 617, 619, 629
- Select 6 credit hours from: Advanced environmental/waste management/related courses in major. Special topic/project courses in environmental/waste management in major are acceptable

## Certificate - Community College Teaching, PB

College of Education

**Graduate Coordinator:** Sonya Drapers

**Email:** drapers@ncat.edu

**Phone:** (336) 285-4385

**Department Chair:** Bernadine Chapman

**Email:** chapmanb@ncat.edu

**Phone:** (336) 285-2141

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### **Additional Admission Requirements**

- Available only as an add-on certificate to students admitted to the MS in Adult Education program at North Carolina A&T State University.

### **Certificate Requirements**

Total credit hours: 15

- Take 15 credit hours: ADED 714, 719, 773, 778, 784

## Certificate - Family and Consumer Sciences, PB

College of Agriculture and Environmental Science

**Graduate Coordinator:** Valerie Giddings

**Email:** vlgiddin@ncat.edu

**Phone:** 336-285-3759

**Department Chair:** Valerie Giddings

**Email:** vlgiddin@ncat.edu

**Phone:** 336-285-3759

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The Certificate Program in Family and Consumer Sciences Education provides individuals with a strong foundation in teaching methods, classroom management, curriculum development, assessment, leadership, education technology, and content knowledge in family and consumer sciences. Graduates will accept positions as teachers at the middle and high school levels with content knowledge in family and consumer sciences. The certificate is especially designed for teachers in Jamaica who are committed to preparing students for family life, work life or for careers in family and consumer sciences.

### **Certificate Requirements**

Total credit hours: 18

- Take 18 credit hours: FCS 641, 681, 682, 683, 701, 702, 734

## Certificate – International Agricultural Development and Engagement, PB

College of Agriculture and Environmental Science

**Graduate Coordinator:** Osei-Agyeman Yeboah **Email:** oyeboah@ncat.edu **Phone:** 336-285-4727

**Department Chair:** Godfrey Ejimakor **Email:** ejimakor@ncat.edu **Phone:** 336-334-7943

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The Advanced Certificate Program in International Agricultural Development & Engagement provides traditional and non-traditional students interested in international agricultural development with the requisite knowledge and skills that will enable them to secure employment and effectively work across cultural boundaries. As a result of the coursework, research, experiential learning opportunities (domestically and abroad), graduates of the program will qualify for positions as mid-level personnel at the USDA Foreign Agricultural Services' missions globally; trade coordinators for international corporations including Cargill, Archer Daniels' Midlands (ADM), Syngenta, Phillip Morris, and others. The graduate certificate will focus on international trade issues, policy analysis techniques; project management, monitoring, and evaluation; techniques for solving complex problems involving multiple stakeholders; and behavior and culture in work organizations.

### **Program Requirements**

Total credit hours: 12

- ABM 738, 638; AGED 712, 713

## Certificate - Marriage and Family Counseling, PB

College of Education

**Graduate Coordinator:** Patricia Bethea-Whitfield **Email:** betheap@ncat.edu **Phone:** (336) 285-4384

**Department Chair:** Tyra Turner Whittaker **Email:** tnwhitta@ncat.edu **Phone:** (336) 285-4386

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### **Additional Admission Requirements**

- Available only as an add-on certificate to students admitted to the MS in Mental Health Counseling program at North Carolina A&T State University.

### **Program Requirements**

Total credit hours: 12

- Take 9 credit hours: HDSV 754, 756, 774
- Select 3 credit hours from: HDSV 753, 757, 769

## Certificate - Rehabilitation Counseling and Behavioral Addictions, PB

College of Education

**Graduate Coordinator:** Glacia Ethridge **Email:** gethridg@ncat.edu

**Phone:** (336) 285-4391

**Department Chair:** Tyra Turner Whittaker **Email:** tnwhitta@ncat.edu

**Phone:** (336) 285-4386

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The Certificate in Rehabilitation Counseling and Behavioral Addictions (RCBA) imparts specific knowledge and skills to its students that are required to effectively assist and counsel those who are impacted by behavioral addictions (i.e., alcohol and drugs, sexual addiction, eating disorders, criminal behaviors, and gambling). The specific emphasis on ethnic minorities serves to address the unique needs of these individuals, which may be overlooked or misunderstood during the treatment process. The RCBA Certificate has been approved by the North Carolina Substance Abuse Professional Practice Board (NCSAPPB) and meets the reduction in NCSAPPB requirements for the Licensed Clinical Addictions Specialist credential.

### **Additional Admission Requirements**

- Available only as an add-on certificate to students admitted to the MS in Mental Health Counseling program at North Carolina A&T State University.

### **Certificate Requirements**

Total credit hours: 12

- HDSV 716, 767, 768, 769

## Certificate - Rehabilitation Psychology and Behavioral Medicine, PB

College of Education

**Graduate Coordinator:** Glacia Ethridge **Email:** gethridg@ncat.edu

**Phone:** (336) 285-4391

**Department Chair:** Tyra Turner Whittaker **Email:** tnwhitta@ncat.edu

**Phone:** (336) 285-4386

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The Certificate Program in Rehabilitation Psychology and Behavioral Medicine prepares counselors who focus on the application of psychological knowledge and skills on behalf of individuals with disabilities and chronic health conditions in order to maximize health and welfare, independence, and functional abilities. The certificate also prepares specialists who are concerned with behavioral approaches relevant to the understanding of physical health and illness, and the application of disease prevention, health promotion, treatment, and rehabilitation. There is specific emphasis on the psychological impact of disability, types of assessment tools and procedures utilized to diagnose individuals with various psychological conditions, and the appropriate techniques utilized to treat individuals with psychopathological disorders.

### **Additional Admission Requirements**

- Available only as an add-on certificate to students admitted to the MS in Mental Health Counseling program at North Carolina A&T State University.

### **Certificate Requirements**

Total credit hours: 12

- HDSV 761, 768, 773, 778



## Certificate - School Administration, PM

College of Education

**uate Coordinator:** Loury Floyd

**Email:** lfloyd@ncat.edu

**Phone:** (336) 285-4427

**Department Chair:** Loury Floyd

**Email:** lfloyd@ncat.edu

**Phone:** (336) 285-4427

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The School Administration Endorsement Licensure Program is designed for individuals who currently hold a master's degree in an educational related field (Counseling, Curriculum & Instruction, Instructional Technology, etc.) and 3 years of teaching (or other professional education experience) or have been employed by an LEA as an assistant principal.

### Additional Admission Requirements

- Earned master's degree in education ( or education related field) from an accredited university
- Five years of successful teaching experiences (or educational-related experience).
- Three years of Adult Leadership experience ( e.g. department chair, grade-level chair)
- NC Standard II Professional License
- Three official letters of recommendation, signed and sealed by the writer. One of the letters must be from current administrator (e.g. principal or assistant principal).
- Faculty Interview
- Electronic portfolio that includes evidence in the following areas:
  - Support for all students achieving high standards of learning
  - Accomplished classroom instruction, which shall include data providing evidence of two years of student growth and learning within the last 5 years
  - Significant leadership roles in past positions
  - Strong oral and written communication skills
  - Analytic abilities needed to collect and analyze data for student improvements
  - Demonstrated respect for family and community
  - Strong interpersonal skills
  - Knowledge of curriculum and instructional practices
- Written Statements -- please see College of Education website for writing prompts.
- A copy of most recent NC Teacher Evaluation (or its equivalent) with at a minimum rating of Accomplished in all standards.
- Current resume

### Certificate Requirements

Total credit hours: 21

- Take 12 credit hours: MSA 773, 774, 776, 778,
- Internship Seminar: MSAL 789
- Internship Practicum: Take 6 credit hours: MSAL 784, 785
- Comprehensive Exam: MSA 788
- Earn a minimum rating of proficient on NCDPI (North Carolina Department of Public Instruction ) School Executives Evidences

The field-based internship must be completed during the fall and spring semesters.

## Certificate - Supply Chain Management, PB

College of Business and Economics

**Graduate Coordinator:** Eric Gladney

**Email:** emgladne@ncat.edu **Phone:** 336-285-3774

**Department Chair:** Joseph Huscroft

**Email:** jrhuscroftjr@ncat.edu **Phone:** 336-334-7632

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The Graduate Certificate in Supply Chain Management provides professionals with the state-of-the-art knowledge necessary to design, manage, analyze, and update entire supply chain systems or various components within them. Graduates will be prepared to accept responsibility in supply chain management, purchasing, transportation or traffic management, warehousing, inventory management, and global supply chain management. The certificate is designed for professionals in transportation, logistics, manufacturing, insurance, food processing, hospitality, retailing, and government regulatory and transportation agencies.

### **Certificate Requirements**

Total credit hours: 15

- TSCM 701, 720, 725, 727; MIS 713

## Certificate - Vocational Evaluation and Work Adjustment, PB

College of Education

**Graduate Coordinator:** Paige Dunlap

**Email:** pdunlap@ncat.edu

**Phone:** (336) 285-4381

**Department Chair:** Tyra Turner Whittaker

**Email:** tnwhitta@ncat.edu

**Phone:** (336) 285-4386

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The Certificate in Vocational Evaluation and Work Adjustment (VEWA) prepares students to administer, score, and interpret a variety of Psychological, Cognitive, Intelligence, Aptitude, and Career tests, especially for persons with disabilities. The certificate also prepares specialists who focus on pre-employment and employment skill development along with reintegrating persons with disabilities into the community. The VEWA program prepares students to become board eligible to obtain national certification as a Professional Vocational Evaluator (PVE).

### **Additional Admission Requirements**

- Available only as an add-on certificate to students admitted to the MS in Mental Health Counseling program at North Carolina A&T State University.

### **Program Requirements**

Total credit hours: 12

- HDSV 771, 772, 776
- Select one course from: HDSV 752, 762, 777

## Course Descriptions

Graduate course descriptions<sup>1</sup> provide the following information:

- Subject prefix
- Course number
- Course title
- Credit hours assigned to the course
- Prerequisites and/or co-requisites (if any)
- Any course with which the course may be cross-listed
- Brief description of the course content
- If a course is graded as Pass/Unsatisfactory rather than with a letter grade
- Any restrictions on the number of times a course may be repeated

### Course Prefix

Courses offered for academic credit are listed by number within each subject and the subjects are listed alphabetically according to prefixes which are assigned as listed in the following columns.

Prefix	Subject
ABM	Agribusiness, Applied Economics & Agriscience Education
ACCT	Accounting & Finance
ADED	Leadership Studies & Adult Education
AET	Applied Engineering Technology
AGED	Agribusiness, Applied Economics & Agriscience Education
AGER	Agribusiness, Applied Economics & Agriscience Education
AGRI	Natural Resource & Environmental Design
ANSC	Animal Science
AST	Applied Science and Technology
BIOL	Biology
BMEN	Chemical, Biological & Bioengineering
BUED	Business Education
CAEE	Civil, Architectural & Environmental Engineering
CHEM	Chemistry Department
CHEN	Chemical, Biological & Bioengineering
CIEN	Civil, Architectural & Environmental Engineering
CM	Built Environment
COMP	Computer Science
COUN	Counseling
CSE	Computational Science & Engineering
CST	Computer Systems Technology
CUIN	Educator Preparation
ECEN	Electrical & Computer Engineering
ECON	Economics

<sup>1</sup> Course descriptions of courses that have not been taught within the last three years are not included.

EDPR	Educator Preparation
ELED	Educator Preparation
ENGL	English
ENVS	Natural Resource & Environmental Design
FCS	Family and Consumer Sciences
FIN	Accounting and Finance
GRAD	Graduate College
HIST	History and Political Science
HORT	Natural Resource & Environmental Design
HPED	Human Performance & Leisure Studies
INST	Administration & Instructional Service
ISEN	Industrial & Systems Engineering
ITT	Computer Systems Technology
LASC	Animal Science
LEST	Leadership Studies & Adult Education
MATH	Mathematics
MEEN	Mechanical Engineering
MGMT	Management
MIS	Management
MKTG	Marketing, Transportation & Supply Chain
MSA	Administration & Instructional Service
MSAL	Administration & Instructional Service
MSTM	Applied Engineering Technology
MUSI	Visual & Performing Arts
NANO	Nanoengineering
NARS	Natural Resource & Environmental Design
OSH	Built Environment
PHYS	Physics
READ	Administration & Instructional Service
SCMG	Marketing, Transportation & Supply Chain
SLSC	Natural Resource & Environmental Design
SOSW	Social Work & Sociology
SPED	Educator Preparation
SYEN	Engineering
TECH	Graphic Design Technology
TSCM	Marketing, Transportation & Supply Chain
WMI	Natural Resource & Environmental Design

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## **ABM Agribusiness, Applied Economics & Agriscience Education**

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### **ABM 634 - Interna Agribusiness Market**

This course examines and analyzes the problems, issues, policies, regulations and procedures relevant to the global marketing of agricultural and related commodities by agribusiness firms. Emphasis is on combining firm-level agribusiness marketing concepts with international agribusiness marketing and export management practices, including the development of international agribusiness marketing plans and case studies from international agribusiness firms.

Prerequisite: None. (F;S;SS)

3.000 Credit hours

### **ABM 638 - Special Prob in Agribusiness**

This course is designed for students who desire to work out special problems in the field of agribusiness management; problem definition, formulation and investigation will be emphasized. Prerequisite: None.

(F;S;SS)

3.000 Credit hours

### **ABM 640 - Advanced Ag and Food In Manage**

This course emphasizes decision-making of agribusiness managers, agribusiness management consultants, and entrepreneurs of agriculturally related firms.

Contemporary topics facing the agribusiness decision-maker such as how to establish an agriculturally based firm, marketing agribusiness firms through E-Commerce, examining food supply chains, establishing contractual agreements with other firms, and evaluating industrial organization within the agribusiness industry are presented.

Prerequisite: None. (F;S;SS)

3.000 Credit hours

### **ABM 705 - Statistical Meth for Agri**

Advanced topics on analysis of variance, regression, correlation, multistage sampling and probability are covered in depth.

Prerequisite: None. (F;S;SS)

3.000 Credit hours

### **ABM 708 - Econometrics in Agribusiness**

Use of econometrics to enhance agribusiness decision making is the focus. Concepts of simple and multiple regression and limited dependent variable models are presented.

Econometric issues of functional form, relevant variables, predictive performance and model diagnostics will be examined.

Numerous applications of techniques to agribusiness problems are used.

Prerequisite: None. (F;S;SS)

3.000 Credit hours

### **ABM 710 - Advanced Microeconomics Theory**

This course applies basic economic tools and models to problems involving supply, demand, individual consumer and firm behavior, and market structure. Basic market structure models covered include competition, monopolistic competition oligopoly, and monopoly. Prerequisite:

None. (F;S;SS)

3.000 Credit hours

### **ABM 720 - Advanced Macroeconomic Theory**

A continuation of aggregate economics, with emphasis upon measurement, growth, and fluctuation of national income is the focus of this course. Prerequisite: None. (F;S;SS)

3.000 Credit hours

### **ABM 796 - Master's Project**

The student will conduct advanced research of interest to the student and the instructor.

A written proposal, which outlines the

nature of the project, must be submitted for approval. This course is only available to project option students. prerequisite: None. (F;S;SS)  
3.000 Credit hours

#### **ABM 797 - Master's Thesis Research**

Master of Science thesis research under the supervision of the thesis committee chairperson, leading to the completion of the Master's thesis. This course is only available to thesis option students. Prerequisite: None. (F;S;SS)  
1.000 to 6.000 Credit hours

#### **ABM 799 - Master's Thesis Continuation**

This course is for master's students who have completed all required credit hour requirements. Prerequisites: Completion of all course work and thesis/project Credits. (F;S;SS)  
1.000 Credit hours

#### **ABM 825 - Research Methods in Agribusi**

The philosophical basis for research methods used in agribusiness is discussed. Alternative research methods are compared with respect to their dependence on the concepts of economic theory, mathematics and statistics. Alternative approaches to planning research projects are evaluated. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **ACCT Accounting & Finance**

#### **ACCT 608 - Seminar in Financial Concepts**

The course will examine basic concepts and tools to provide integrative coverage of accounting and finance. Accounting topics include the interpretation, analysis and use of accounting information, including basic accounting procedures, budgeting, cost tracking and cost/profit analysis. Finance topics include concepts and techniques for

planning and managing the acquisition and allocation of financial resources, including cost of capital, capital structure and capital budgeting. coverage of these areas will be integrated by examining the basic contributions of each are to the decision processes for raising and allocating funds and the purposes they serve in assisting lenders and investors in assessing financial capacity and performance. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

#### **ACCT 643 - Advanced Income Tax Accounting**

This course is a study of federal income tax laws related to partnerships, corporations, and fiduciaries. A study of property transactions is continued. Students are introduced to tax case research and the tax software for businesses. It is recommended that this course be taken for credit only and not for audit purposes. Prerequisite: C or above in ACCT 443, Accounting majors only, senior standing, or permission of instructor. (F;S;SS)  
3.000 Credit hours

#### **ACCT 689 - Advanced Appli in Finan Acct**

The topics covered in this course give additional consideration to selected accounting problems. Current accounting issues/problems are examined as well as approaches to their resolution. Prerequisites: None. (F)  
3.000 Credit hours

#### **ACCT 690 - Advanced Accounting Theory**

This course focuses on the fundamental accounting concepts, principles, and procedures that make up the theoretical underpinning of financial accounting. In addition, emphasis is placed on knowledge needed for the CPA exam. Topics reviewed

will include structure of financial statements, depreciation methods, inventory valuation, revenue recognition, fair value accounting, liabilities, pensions, leases, and taxes. This course is NOT recommended for audit. Prerequisites: C or above in ACCT 442, senior standing, Accounting major only, or permission of instructor. (F;S;SS) 3.000 Credit hours

### **ACCT 691 - Govern and Not-for-Profit Acct**

This course presents basic concepts of accounting for governmental and nonprofit entities. Financial reporting, budgeting, funds sources and uses, and the environment in which these entities operate will also be explored. Differences in reporting by governmental entities and nonprofit organizations, based on compliance with different standard-setting bodies, will be covered. Accounting for local and state governments, nonprofit organizations, colleges and universities, as well as health care organizations is included in this course. Prerequisites: C or above in ACCT 222 and Senior standing, Accounting major only, or permission of instructor. (F;S;SS) 3.000 Credit hours

### **ACCT 710 - Manag Account Deci Making Con**

This course focuses on the role of management accounting in planning, controlling, evaluating performance and decision-making. The course covers traditional and contemporary concepts and techniques of product and service costing, budgeting, and interpretation of internal reported information. Emphasis is also given to the application of concepts and decision tools for managerial decision-making. The course will use case studies and spreadsheet analysis for an integrative application of managerial accounting concepts.

Prerequisites: Minimum C grade in ACCT 222 or ACCT 608 or permission of instructor. (F;S)

3.000 Credit hours

### **ACCT 761 - Advanced Auditing**

This course will build on knowledge and skills learned in a typical introductory auditing principles course. Topics will include the application of auditing concepts and techniques to various transaction cycles including the sales and collection cycle, the acquisition and payment cycle, the payroll and personnel cycle, the inventory and warehousing cycle and the capital acquisition and repayment cycle. Procedures to audit cash balances will also be covered. This course may also include an overview of the application of audit techniques to internal auditing, operational auditing and the audit of governmental entities. Case studies will be used. Prerequisites: C or above in ACCT 461 or equivalent. (F;S;SS) 3.000 Credit hours

### **ACCT 763 - Advanced Cost Accounting**

This course will cover contemporary issues/problems in cost and managerial accounting in the context of the modern business environment. Emphasis will be given to cost information systems and other specialized cost topics such as analytical models, global aspects in management accounting, decision models, and nontraditional accounting systems. Case methodology and computer analysis will be utilized. Prerequisites: C or above in ACCT 344 or equivalent. (F;S;SS) 3.000 Credit hours

## **ADED Leadership Studies & Adult Education**

### **ADED 707 - Foundations of Adult Education**



This course will introduce and address the philosophical, sociological and psychological foundations of adult education, and develop a view of the subject as a broad, diverse, and complex field of study, research, and professional practice. Students will survey many institutions, programs, and individual activities. The range of methods and materials used to enable adults to learn will be discussed. Program candidates MS in Adult Education must earn the grade of B or better in this course. Prerequisites: None. (F;S)  
3.000 Credit hours

Ldrshp Studies & Adult Ed Department  
**ADED 708 - Instruc Methods in Adult Educa**

This course introduces learners to a variety of methods and strategies needed to facilitate adult learning in formal, non-formal, and informal settings and examines the unique characteristics of adult educational contexts. Special attention is given to adult education philosophical perspectives, teaching/learning styles. Program candidates MS in Adult Education must earn the grade of B or better in this course. Prerequisites: None. (F;S)  
3.000 Credit hours

**ADED 709 - Adult Development and Learning**

This course examines the unique characteristics, motivation, and educational participation of the adult learner. Emphasis is placed on theories of adult learning and intelligence and models of adult cognitive and psychosocial development. Program candidates MS in Adult Education must earn the grade of B or better in this course. Prerequisites: None. (F;S)  
3.000 Credit hours

**ADED 710 - Found Human Resource Dev**

Human Resource Development (HRD) is concerned with the human resources within both public and private sector organization and is defined as the integrated use of employee training and development, organization development, and career development, to improve individual, group, and organizational effectiveness in attaining strategic goals and objectives. This course addresses concepts, practices, and issues in HRD with a focus on workplace learning organizational analysis.  
3.000 Credit hours

**ADED 711 - Social Gerontology**

This is an introductory course engaging participants in the study of cultural, sociological, and economic factors affecting older adults and their implications for adult education and lifelong learning practices. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

**ADED 714 - Community College/Post Sec Ed**

This is a study of the purposes, organization, functions, current trends and historical evolution of the comprehensive community college, and its role within adult, community and higher education. The North Carolina Community College System is emphasized.  
3.000 Credit hours

**ADED 715 - Women in Adult Education**

This course examines the progression of women professionals in the adult education discipline within a cultural and sociopolitical context. The emphasis is placed on initial exclusion, marginalization, and evolving, participation, scholarship and leadership.  
3.000 Credit hours

**ADED 716 - Research in Adult Education**

This research course provides students with an examination of goals, purpose, principles, and methods of current research in the field

of adult education. Quantitative, qualitative, and mixed-methods research design will be introduced as used in applied research in adult education. Program candidates MS in Adult Education must earn the grade of B or better in this course. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

#### **ADED 719 - Assessment and Evaluation**

This course instructs participants on how to identify, design, and develop assessment methods appropriate to adult learners. With emphasis on contexts of higher education, topics include quantitative and qualitative classroom assessment; formative vs. summative assessment; test interpretation; social, legal and ethical implementations of assessment; reliability and validity; norm vs. criterion tests; placement tests; program evaluation models; as well as formative and summative evaluation. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

#### **ADED 721 - Organi and Admin in Adult Edu**

This course is an examination of theories, concepts and practices as they relate to organizational dynamics and functions of administrators within various adult education context. Emphasis is placed on tasks of planning, organizing, staffing, financing, motivating, decision-making, evaluating and delegating, which are key components of adult education programs. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

#### **ADED 722 - Diverse Perspec in Adult Educa**

This course explores a broad range of topics related to diversity within various adult education contexts. Course readings and assignments related to a wide variety of settings including colleges and universities,

adult basic education, GED programs, adult literacy programs, community-based educational programs, workplace learning, and continuing professional education. Prerequisites: ADED 707, ADED 709, permission from professor. (F;S;SS)  
3.000 Credit hours

#### **ADED 729 - Designing Edu Prog for Adults**

This course will teach learners how to effectively plan and deliver educational activities for diverse adult learners with various abilities, identities, and positionalities. Prerequisites: None. (F;S;S)  
3.000 Credit hours

#### **ADED 773 - Leadership in Adult Higher Ed**

This course explores leadership theories, styles, ethics, values, principles, and perspectives. Case studies and other methods are used to examine leadership situations as a means of demonstrating and exercising practical applications of the concepts studied to various settings of adult higher education. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

#### **ADED 776 - Principles of College Teaching**

This course provides an in-depth understanding of the framework and mechanics essential to community college and university teaching. Topics include course planning and organization, syllabus design, diversity appreciation, integration of technology, and the evaluation of learning. Prerequisites: ADED 708, ADED 709. (F;S)  
3.000 Credit hours

#### **ADED 778 - Introduc to Student Sup Servic**

This course introduces students to the field of student support services with

consideration of adult learners in higher education. Topics included are history of higher education and student affairs; theoretical perspectives in student development; and the mission, goals, and various functions of student support services in postsecondary educational contexts. Prerequisites: None. (F;S;SS) 3.000 Credit hours

### **ADED 784 - Practicum Experi In Adult Edu**

This course engages participants in a supervised field experience with an agency, business, institution or organization, to enable praxis of adult education theory and methodology. The course offers shared reflection, integration, and discussion of theoretical application, and methodological implementation within the practicum experience. The practicum experience consists of (125) clock hours. Program candidates MS in Adult Education and Certificate in Community College Teaching must earn the grade of B or better in this course. Restrictions: Must be enrolled in the MS in Adult Education or PB Certificate in Community College Teaching. Prerequisites: Master's Comprehensive Examination; or permission by supervising professor. (F;S) 3.000 Credit hours

### **ADED 797 - Master's Thesis**

This course provides direction and guidance in the completion of the Master's thesis research. This course is available only to thesis option participants and is completed under the supervision of a thesis advisor in collaboration with a thesis committee as approved by the department chairperson. Prerequisites: Students must apply and obtain approval of the supervising professor and the department chairperson one semester before registering for this course. Prerequisites: ADED 716, ADED 794.

(F;S;SS) Note: May be repeated for credit. 1.000 TO 6.000 Credit hours

### **ADED 799 - Continuation Residency**

Meets requirement for continuous enrollment during final term prior to graduation when all course credit requirements (including thesis or dissertation) have been completed. This course is non-graded, may receive a grade of S/U, and credit for this course does not count toward the degree. May be repeated twice. Prerequisites: ADED 797. (F;S;SS) ) Note: May be repeated for credit. 1.000 to 3.000 Credit hours

## **AET Applied Engineering Technology**

### **AET 610 - Six Sigma Ap to Tech Manage**

This course introduces students to the concepts of Six Sigma, the impacts of Six Sigma on quality improvements of enterprises, and the relationship between Six Sigma and total quality management. Procedures and techniques for implementing Six Sigma and case studies for its applications will be presented. Prerequisite: Graduate Standing. (F;S) 3.000 Credit hours

### **AET 613 - Supply Chain Management Sys**

This course introduces to students the functionalities and execution of Supply Chain Management (SCM) systems. In addition, it shows how information technology and Internet can be integrated into management process. Prerequisite: Graduate Standing. (F;S) 3.000 Credit hours

### **AET 745 - Managing New Product Develop**

This course covers the new product development cycle and emphasizes the benefits of Early Manufacturing Involvement (EMI) and Logistics Processes.

Use of cross-functional teams in product development is also explored. Prerequisite: Graduate Standing. (F;S)  
3.000 Credit hours

**AET 780 - Reliability Testing and Anal**

This course study the metrology and reliability testing at various stages of manufacturing processes for zero failures. Includes failure analysis, exponential and Weibull Failure Law, and reliability prediction of components and/or systems. Prerequisites: MSTM 703 or equivalent or consent of instructor. (F;S)  
3.000 Credit hours

**AET 799 - Special Topics in Tech Manage**

This course will allow a group of students to work on special topics of interest which are not covered by an existing course. These are emerging themes that reflect the rapidly changing nature of environments and technologies. Prerequisite: Consent of the instructor. (F;S)  
3.000 Credit hours

**AGED Agribusiness, Applied Economics & Agriscience Education**

**AGED 600 - Youth Organ & Prgm Mgmnt**

Principles, theories, and practices involved in organizing, conducting, supervising and managing youth organizations and programs will be examined. Emphasis will be on the analysis of youth organization and programs in vocational and extension education.  
3.000 Credit hours

**AGED 601 - Adult Ed Vocation & Exten Ed**

This course is a study of the principles and problems of organizing and conducting programs for adults. Emphasis is given to the principles of conducting organized

instruction in agricultural education, extension and related industries. (F)  
3.000 Credit hours

**AGED 607 - Environmental Education**

This course examines the principles and practices of understanding the environment and the interrelated complexities of the environment and materials that need to be developed for use by high school teachers of agriculture and other professional workers. (S)  
3.000 Credit hours

**AGED 608 - Agri Exten Organ & Methods**

The principles, objectives, organization, program development and methods in cooperative extension will be examined.  
3.000 Credit hours

**AGED 611 - Spec Prob Agricul Ed & Exten**

Special work in problems dealing with Agricultural Education and Extension will be examined. Students should be at the graduate level or be working on their lateral or provisional license in agricultural education. (Enrollment by permission of department) ) Note: May be repeated for credit.  
1.000 TO 6.000 Credit hours

**AGED 612 - Field Studies in AG ED**

Field Studies involved in Agricultural and Extension Education. (Enrollment by permission of department.) ) Note: May be repeated for credit.  
1.000 TO 6.000 Credit hours

**AGED 620 - Rural Communities and Leader**

This course will focus upon the importance of grassroots leadership development within the context of rural community settings. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

**AGED 700 - Adv Comp & Portfolio Dev**

This course will prepare students for the entire master's program. Students will review state mandate and goals. Students will also be introduced to the professional portfolio that is required of all masters students upon the completion of their program.

1.000 Credit hours

**AGED 703 - Scientific Mthds Research I**

Methods of procedures in investigation and experimentation in education, accompanied by critical examination of studies made in agricultural education and related fields. A research problem is developed under the supervision of the staff.

3.000 Credit hours

**AGED 704 - Found & Phil of AG ED**

This advanced course deals with the development, organization, and philosophical foundations of agricultural education from colonial times to the present. Emphasis is placed on the role of societal and scientific changes, the federal government, and philosophy and its role in life including the rise of education in America, legislation having an impact on agricultural education, education in agriculture, and current issues in agricultural education on the evolution of agricultural education. Students will be expected to develop and defend their philosophy of agricultural education based on the foundations and philosophy of Agricultural Education. In addition to the above, students will be expected to research educational topics, critique the current research and present a seminar on their research topic.

3.000 Credit hours

**AGED 705 - Adv Ag Business & Science**

Students will review and study the literature

on innovations in agribusiness/science practices, processes and product technologies. They will become knowledgeable and articulate about issues related to the role and contribution of science and research to agriculture over time, the development and diffusion of best practices, the impact of specific technological breakthroughs and basic techniques for assessing the efficacy of these.

3.000 Credit hours

**AGED 710 - Prog Dsgn, Mgmnt & Eval**

The planning, management and development of agricultural educational programs including needs assessment, objectives, development and content and materials selection. Evaluation of instructional programs; formative for program improvement and summative for outcome accountability. Prerequisite: None. (F;S)

3.000 Credit hours

**AGED 711 - Adv Teaching & Assessment Mthd**

This course focuses on advanced concepts and methods relevant for both formal and informal agricultural education presentations, effects that methods may have on individuals involved in the learning experience and demonstrations of proficiency in use of various advanced methodologies, technologies and concepts. Students will focus on human learning development, diversity issues, motivational strategies to plan, use and evaluate student learning. Students will research and present projects based on the course of study. Students will keep a reflective journal based on the infusion of learning methods used in their educational occupations. Prerequisites: None. (F;S;SS)

3.000 Credit hours

**AGED 712 - Gv Policy Anal Ag Prob Solving**

Students will become conversant with basic principles, procedures, and phases of public policy formulation, analysis and decision making. Students will use agricultural issues/problem and policy as case studies to trace the evolution of an issue/problem/felt need into legislation or policy. Students will also learn basic techniques for analyzing policy impacts. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

**AGED 713 - Program Project Management**

3.000 Credit hours

**AGED 750 - Community Problems**

A study of the common problems of the community that relate to agriculture and related areas and of solutions for these problems.

3.000 Credit hours

**AGED 751 - AG ED Across the Curriculum** This advance course will center on the application of curriculum development models, theories and processes in agricultural education. A large portion of the class will be devoted to the integration of agricultural curriculum into other subject areas such as Math, Science, English and History and the integration of other subject matter areas into agricultural education. Student will evaluate curriculum products and learn to all students as well as reinforce other curricular areas. modify curriculum to meet the needs of all students as well as reinforce other curricular areas. Students will see how content matter can be reinforced as it is taught across all curricular areas. Students will be expected to present a project based on developing curricular plans and materials that address curriculum integration as related to agricultural education. Prerequisite: None. (F,S)

3.000 Credit hours

**AGED 752 - Spec Populations in AG ED**

This advance course will focus on the diverse needs of students for learning to take place. Special emphasis will be placed on the instruction of agricultural education to populations of students within economic, gender, ethnic, cultural, political, physical differences. Students will discover and use educational theory to examine strategies and plans to overcome problems in their educational occupations. Students will research both legal requirements and expectations that effect what can be done with increase student learning. Students will be required to develop and present a diversity management plan for their program. Prerequisite(s): None. (F;S)  
3.000 Credit hours

**AGED 797 - AGED Prog Mgmnt Plan Project**

Students in the Non-thesis option will be required to put a management plan together for their educational occupational program. The plan will include research on the needs and expectations of the educational program and the evidence that either shows compliance or plans to meet the program's needs. Students will work with their committee to establish the requirement of the plan and evidence which will be required to meet the plans expectations. Students will present their plan in AGED 796. Prerequisite(s): AGED 700, 703, and 710.  
4.000 Credit hours

**AGED 799 - MS Thesis Research**

Master of Science thesis research under the supervision of the completion of the Master's thesis. This course is only available to thesis option students. Prerequisite: Permission of advisor.  
6.000 Credit hours

## **AGER Agribusiness, Applied Economics & Agriscience Education**

### **AGER 796 - Master's Project**

Students in the Non-thesis option will be required to complete an applied research project. Prerequisites: Advisor Consent. (F;S;SS) ) Note: May be repeated for credit. 3.000 Credit hours

### **AGER 797 - Master's Thesis**

Master of Science thesis research under the supervision of the completion of the Master's thesis. This course is only available to thesis option students. Prerequisite: Permission of advisor. Prerequisites: Advisor Consent. (F;S;SS) ) Note: May be repeated for credit. 1.000 TO 6.000 Credit hours

### **AGER 799 - Continuation Residency**

Meets requirement for continuous enrollment during final term prior to graduation when all course credit requirements (including thesis or dissertation) have been completed. This course is non-graded, may receive a grade of S/U, and credit for this course does not count toward the degree. May be repeated twice. Prerequisites: Graduate Standing. (F;S;SS) ) Note: May be repeated for credit. 1.000 TO 3.000 Credit hours

## **AGRI Natural Resource & Environmental Design**

### **AGRI 604 - Experimental Mthds in Rsrch**

Experimental design, methods and techniques of experimentation, application of experimental design to plant, Animal and food research; and interpretation of experimental data will be included in the course. Prerequisite: MATH 224.(F)

3.000 Credit hours

### **AGRI 700 - Sustain Ag Local Food Sys**

**Anal** Sustainable Agriculture and local Food Systems Analysis: This course will focus upon issues impacting 21st Century Sustainable Agriculture and Local Food Systems, and offer interdisciplinary methods for approaching them. Prerequisite: None. (F)

3.000 Credit hours

### **AGRI 780 - Inte Prob Anal Agri Enviro Sys**

Students will be required to identify and analyze integrated case studies concerning issues and problems within Agricultural and Environmental Systems, for which they will research, design, and propose solutions. Additionally students will complete an integrated systems inquiry assessment within their respective concentrations. Prerequisites: Graduate Standing. (F;S;SS)

3.000 Credit hours

### **AGRI 799 - Thesis in Food & Nutri Sci**

Master of Science thesis research under the supervision of the thesis committee chairperson, leading to the completion of the Master's thesis. This course is only available to thesis option students.

1.000 TO 6.000 Credit hours

## **ANSC Animal Science**

### **ANSC 611 – Nutrition**

Fundamental of modern animal nutrition; classification of nutrients, nutrient metabolism; nutrient partitioning in production. (S)

3.000 Credit hours

### **ANSC 637 - Environmental Toxicology**

Basic principles of environmental toxicology; regulatory perspectives; spills, anthropogenic pollution problems;

ecological and human risk assessments; overview of classes of toxic agents, routes of exposure, target animals (aquatic, terrestrial, and mammalian species), and toxicological testing. Prerequisites: BIOL 101, CHEM 106 or 107, and CHEM 251. (S)  
0.000 OR 3.000 Credit hours

**ANSC 641 - Disease Mgmt Livestock Poultry**

Prevention and control of diseases in livestock species and Poultry; Micro and macroenvironments that result in disease. Prerequisite: ANSC 451. (S)  
0.000 OR 3.000 Credit hours

**ANSC 665 - Techniques in Biotechnology**

Basic principles and laboratory experiences in biotechnology Concepts of DNA structure, function, related applications in biotechnology. Methods: isolating DNA and RNA; genomic DNA and plasmid DNA analysis, gel electrophoresis, Southern hybridization, gene probes, and more. Prerequisite: CHEM 251, ANSC 214, BIOL 466, or permission of instructor. (F;S)  
0.000 OR 3.000 Credit hours

**ANSC 701 - Topics in Animal Health**

Influence of the environment upon the health status of animals within the disciplines of epidemiology, toxicology, pathobiology, reproductive physiology, nutrition, and microbiology.  
3.000 Credit hours

**ANSC 702 - Seminar in Animal Health**

Seminar includes faculty, graduate students, and guest lectures on research, scientific methods, the publication process and related topics in the field of animal health sciences.  
1.000 Credit hours

**ANSC 708 - Sp Problems in Animal Health**

Independent investigations to strengthen the student's knowledge of the scientific methods. Investigations are conducted within a variety of research areas congruent with the environmental focus of the Animal Health Science program.  
2.000 Credit hours

**ANSC 713 - Global Livestock Systems**

Research relating to various phases of livestock production; the livestock enterprise on the whole farm system. Overall economic performance. (F)  
3.000 Credit hours

**ANSC 771 - Bioinformatics Genome Analysis**

The course will be on bioinformatics and its application to genome analysis, computational tools and methods for organizing data, as well as large scale DNA sequencing, gene expression analysis methods and algorithms for basic and advanced search techniques.  
3.000 Credit hours

**ANSC 782 - Cellular Pathobiology**

Current concepts of the structure, function and pathobiology of the cell. Methodologies used to study the cell and its processes. Prerequisite: Chem 651 or permission of instructor.  
3.000 Credit hours

**ANSC 796 - Master's Project**

The student will conduct advanced research of interest to the student and the instructor. A written proposal, which outlines the nature of the project, must be submitted for approval. This course is only available to project option students. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

**ANSC 799 - Thesis Animal Health Science**



Note: May be repeated for credit.  
1.000 TO 6.000 Credit hours

### **ANSC 999 - Con't Thesis Anim Hlth Science**

Note: May be repeated for credit.  
1.000 Credit hours

## **AST Applied Science and Technology**

### **AST 822 - Environmental Energy Econom II**

This course presents interrelationships of natural resource use and the environment. Topics covered include applied welfare and benefit-cost analysis, externalities and pollution abatement, and quantitative methodologies for analyzing energy, natural resource, and environmental problems. Prerequisites: EES 821. (S)  
3.000 Credit hours

### **AST 830 - Foundations of Scientific Rese**

This course provides students the foundation needed to successfully design and communicate their dissertation research. Students will improve their ability to perform a literature search, read and understand scientific journal articles, develop clear hypotheses about issues for which there is no answer in the literature, design experiments to test hypotheses, and present them clearly in writing and orally. Prerequisites: Graduate Standing and consent of instructor. (F;S;SS)  
3.000 Credit hours

### **AST 831 - Math and Computational Model**

This course explores how to mathematically model a system, select an appropriate numerical method, implement computer simulations, and assess the ensuing results. Topics include nonlinear, 2D, and 3D models; nonrectangular domains; systems of

partial differential equations; and large algebraic problems requiring high-performance computing. Prerequisites: Graduate Standing and consent of instructor. (F;S;SS)  
3.000 Credit hours

### **AST 841 - Biomaterials Characterization**

This course presents the analytical and spectroscopic techniques and tools available for examining molecular and macroscopic structural features of naturally occurring materials with emphasis on the lignocellulosic substrate. Topics covered will provide an appreciation for the fundamental principles behind the available techniques. Prerequisites: Graduate standing. (F;S)  
3.000 Credit hours

### **AST 843 - Biomass Biological Conver Proc**

This course presents the available biological conversion methods and processes that are available to convert biomass into commodity chemicals and energy as part of a biorefinery concept. Topics covered will highlight the challenges of bioconversions in terms of cost, dewatering, and limited thermal and pH ranges. Prerequisites: Graduate standing. (F;S)  
3.000 Credit hours

### **AST 850 - Physical Meteorology**

This course presents physical principles related to atmospheric environmental systems, processes, and measurements. Topics covered include atmospheric thermodynamics, atmospheric radiation transfer, and cloud microphysical processes. Prerequisites: Graduate standing and consent of instructor. (F;S,SS)  
3.000 Credit hours

**AST 852 – Climatology**

This course presents observed global climate and mechanisms that determine climate.

Topics covered include earth climate history and present-day climate, atmospheric and oceanic general circulation, radiative processes, climate variability and change, and climate change processes. Prerequisite: Graduate standing. (F;S)

3.000 Credit hours

**AST 853 - Numerical Weather Prediction**

This course presents the physical and mathematical basis for numerical weather prediction with computer experiments to demonstrate principles and techniques.

Topics covered include derivation of sets of prediction equations consistent with scale analysis and dynamical constraints, atmospheric waves and filtered equations, numerical methods and computational instabilities, filtered and primitive equation models, and National Weather Service operational models. Prerequisites: None.

(F;S)

3.000 Credit hours

**AST 885 - Doctoral Special Topics**

This course allows the introduction of new topics on a trial basis at the doctoral level. The topic of the course will be determined prior to registration. Prerequisites: Graduate standing and consent of instructor. (F;S;SS)  
Note: May be repeated for credit.

2.000 TO 4.000 Credit hours

**AST 984 - Laboratory Internship**

This course allows a student to explore various research areas first-hand by performing multiple projects in different laboratories under the mentorship of members of the graduate faculty. It should be taken before a student passes the qualifying exam. Grading is satisfactory/unsatisfactory evaluation only. Prerequisites: Doctoral standing and consent of instructor.

(F;S)

3.000 Credit hours

**AST 985 - Doctoral Supervised Practicum**

This course represents the supervised internship for the doctoral student that satisfies the 3 credits of required professional development. Oral and written presentations professional development. Oral and written presentations on the experience will be provided to the faculty. Grading is satisfactory/unsatisfactory evaluation only. Prerequisites: Doctoral standing and consent of instructor. (F;S)  
3.000 Credit hours

**AST 992 - Doctoral Seminar**

This course includes presentations delivered by the doctoral students, faculty, and invited speakers on topics related to energy and environmental issues and research. Grading is satisfactory/unsatisfactory evaluation only. May be repeated. (F;S;SS) Note: May be repeated for credit.

1.000 TO 6.000 Credit hours

**AST 993 - Doctoral Supervised Teaching**

This course represents the supervised teaching for the doctoral student that satisfies required professional development. This course introduces the under the supervision of a faculty mentor. Doctoral students who serve as teaching assistants or as instructors are required to take this course during the first year they teach. Grading is Satisfactory/ Unsatisfactory evaluation only. Prerequisites: Doctoral standing. (F;S)  
3.000 Credit hours

**AST 994 - Doctoral Supervised Research**

This course is supervised research under the mentorship of a member of the graduate faculty before a student passes the preliminary exam. This research should lead to the identification of a dissertation topic and written research proposal. Grading is

satisfactory/unsatisfactory evaluation only.  
Prerequisites: Doctoral standing. (F;S;SS)  
3.000 TO 9.000 Credit hours

### **AST 997 - Doctoral Dissertation**

This course represents the supervised research leading to the dissertation for the doctoral student. Doctoral dissertation research will be conducted under the supervision of the dissertation committee chairperson and include regular meetings with the dissertation committee to evaluate progress on the dissertation. Grade is satisfactory/unsatisfactory evaluation only.  
Prerequisites: Doctoral standing. (F;S;SS)  
Note: May be repeated for credit.  
1.000 TO 15.000 Credit hours

### **AST 999 - Continuation/Residency**

Meets requirement for continuous enrollment during final term prior to graduation when all course credit requirements (including dissertation) have been completed. This course is non-graded, may receive a grade of S/U, and credit for this course does not count toward the degree. May be repeated twice.  
Prerequisites: Doctoral standing. (F;S;SS)  
Note: May be repeated for credit.  
1.000 TO 3.000 Credit hours

## **BIOL Biology**

### **BIOL 615 - Principles of Virology**

This course is a study of viruses and their effects on living organisms. Special emphasis will be placed on virus structure and classification, virus replication, viruses that infect bacteria, plants, and humans, and strategies for preventing virus infections. The contribution of viruses to the development of immunology, biotechnology, and other areas of science, and the role of viruses in evolution, the development of cancer, and bioterrorism will be examined. Prerequisites: BIOL 101,

BIOL 221. (F;S)  
3.000 Credit hours

### **BIOL 631 - Endocrine Physiology**

This course will provide a basic introduction to endocrine function and include recent advances in the field of endocrinology. Emphasis will be placed on general aspects of endocrine physiology, the organization of the endocrine system, mechanisms of hormone action, and control of endocrine secretion. Prerequisites: BIOL 401 and 466.  
3.000 Credit hours

### **BIOL 640 - Intro Bioinformat & Genomi Rsc**

3.000 Credit hours

### **BIOL 671 - Prin & Pract of Immunology**

A study of mammalian immune response; particularly in humans. Special emphasis will be placed on the physiology, genetics, and regulation of immune responses. Interrelationships between nonspecific and specific immune reactions, humoral and cell-mediated immunity, effector cells, and diseases are also stressed; along with research and diagnostic methodologies. Prerequisites: Biology 221 and 466; Chemistry 221 and 222.  
3.000 Credit hours

### **BIOL 685 - Special Topics in Biology**

3.000 Credit hours

### **BIOL 702 - Biological Seminar**

Oral and written presentations by students on special topics and recent advances in the field of Biology. Strategies for writing a thesis will be discussed, and the preparation by students of a short proposal for thesis research will be encouraged. Prerequisites: None.  
1.000 Credit hours

**BIOL 703 - Experimental Methods  
Biology**

An introduction to the scientific method basic techniques, and equipment used in experimental research in Biology. The course will provide a foundation for enabling students to initiate and conduct independent research. Prerequisites: None. 3.000 Credit hours

**BIOL 710 - Intro to Re in the Biologi Sci**

This course is designed to provide graduate students the foundation needed to successfully design and implement their thesis research. Each student will focus on understanding the literature, the techniques, and the equipment that will be used to complete his/her thesis research. Prerequisite: Graduate Standing. (F;S;SS) 3.000 Credit hours

**BIOL 722 - Advanced Concepts in  
Biology I**

This course focuses on the nature of scientific knowledge and critical biological processes. Emphasis will be placed on the interconnection between these biological concepts through the exploration of current research. Prerequisite: Restricted to MAT (Biology) majors. (F;S;SS) 3.000 Credit hours

**BIOL 749 - Recent Adv in Cell Biology**

A course designed to present recent trends concerning functions of organized cellular and subcellular systems. Current research as it relates to the molecular and fine structure basis of cell function, replication, and differentiation will be discussed. 3.000 Credit hours

**BIOL 755 - Systems Biology**

This is an advanced graduate level course designed to present recent trends on the systematic study of complex interactions in

biological systems, and how these interactions give rise to function and behavior of the biological system.

Genomics, transcriptomics, proteomics, cytomics, RNA interference, and relevant bioinformatics concepts and applications will be studied. The course will also focus on how high through put data is analyzed, integrated and applied to the understanding of complex biological systems. Prerequisite: BIOL 749. (F;S;SS)

3.000 Credit hours

**BIOL 762 - Molecular Pathogenesis of  
Can**

This course examines pathobiological features of cancer. An interdisciplinary approach will be utilized that will draw from epidemiology, genetics, molecular biology, and clinical medicine to investigate cancer etiology, pathogenesis, prevention, and treatment. Students in this course will also be required to develop innovative supplemental instruction materials for undergraduate students taking a concurrent course. Students in this course will also be required to present oral presentations based on cancer literature during the departmental journal club. Prerequisite: Graduate standing. (F;S;SS)

4.000 Credit hours

**BIOL 785 - Writing for the Biologi Scien**

This is an advanced graduate level course designed to allow graduate students in the biological sciences to develop proficiency in writing scientific manuscripts and research proposals following the National Institutes of Health, National Science Foundation, and other federal agency guidelines. Students will improve their ability to read and understand scientific journal articles, ask questions, develop clear hypotheses about issues for which there is no answer in the literature, design experiments to test hypotheses and present them very clearly

and concisely in writing. Prerequisite:  
Graduate Standing. (F;S;SS)  
3.000 Credit hours

### **BIOL 789 - Biological Seminar I**

Faculty will present lectures on their research areas to acquaint students with research opportunities in the department. Prerequisites: None. (F;S;SS)  
1.000 Credit hours

### **BIOL 794 - Biology Thesis I**

Master's level research in biology. Prerequisite: Consent of advisor. (F;S;SS)  
6.000 Credit hours

### **BIOL 796 - Master's Project**

In this course the student will conduct a research project under the supervision of an advisor. A written proposal, a final report, and an oral presentation and defense of the project before the project committee are required. Prerequisite: Graduate standing. (F;S;SS)  
6.000 Credit hours

### **BIOL 797 - Biology Thesis II**

Master's level research in biology. Prerequisites: Biology 862 and consent of advisor. (F;S;SS)  
6.000 Credit hours

### **BIOL 799 - Con't of Thesis for Biology**

Master's level research in biology. Prerequisites: BIOL 794, 797, consent of advisor and Graduate Program Coordinator. (F;S;SS)  
1.000 Credit hours

### **BIOL 860 - Parasitology**

3.000 Credit hours

## **BMEN Chemical, Biological & Bioengineering**

### **BMEN 695 - Computational Systems Biology**

This course covers computational systems physiology and biology. Students will learn how to develop biomedical metabolism tissue models, cellular physiological models, and network models for intracellular signaling pathways using Matlab and COMSOL. Also covered will be biological data mining, physiological modeling and simulation. Prerequisite: Graduate Student. (F)  
3.000 Credit hours

### **BMEN 711 - Biomaterials and Biocompatibil**

This course examines the fundamental and advanced topics in biomaterials and biocompatibility applications and assumes some background in organic chemistry and biology. The first half of the course connects material chemical properties to performance issues relevant to biomaterial applications. The second part of the course introduces biocompatibility issues as they follow from protein absorption. Prerequisites: BMEN 310 or equivalent course. (F;S)  
3.000 Credit hours

### **BMEN 712 - RE Meth Design Exper Bio Engi**

This course addresses research methods and protocols and introduces experimental designs and data analysis for research projects. Specific topics covered include Latin Squares; complete and incomplete block designs; one, two, and three variable factorials; fractional factorials; nested designs; and 2K designs will be covered. Prerequisite: Graduate Student Standing. (F;S)  
3.000 Credit hours

### **BMEN 713 - Biotechnology Entrepreneur**

This course introduces students to innovation and entrepreneurial skills

development oriented toward a biotechnology and bioengineering enterprise. Topics covered include intellectual property development, technology transfer, evaluation of market viability, financing, marketing and operations. The course will also cover government regulations. Prerequisite: Graduate Student Standing. (F;S)  
3.000 Credit hours

### **BMEN 714 - Funda of Cell Biology for Engi**

This course examines the molecular events in cell function using molecular genetics, cell biology, and fundamental biochemistry. Prokaryotic and Eukaryotic systems are examined. Prerequisites: Graduate Student or consent of instructor. (F;S)  
3.000 Credit hours

### **BMEN 733 - Musculoskeletal Biomechanics**

This course will provide students with a detailed understanding of the structure and function of the tissues in the musculoskeletal system. Specific topics will include the kinematics, muscle forces and joint loads during human movement and the mechanics of the musculoskeletal connective tissues such as ligament, tendon, bone, cartilage and muscle. Special emphasis will be placed on the relationship between function and material properties of these tissues as revealed in the current scientific and engineering literature. A research paper that includes a computational analysis will be required as a term project. Prerequisite: Graduate Students Standing. (F;S)  
3.000 Credit hours

### **BMEN 741 - Medical Imaging Systems I**

A systems perspective introduction to the fundamentals of medical imaging techniques used to generate cross-sectional images of patients. Emphasis is on use of multi-

dimensional Fourier transforms to develop the generalized central-section theorem used in tomography at the imaging equation used in MRI. The critical concepts of image SNR and image quality will also be introduced. MRI and x-ray CT are used as two sample modalities to explore these basic concepts. Prerequisites: Graduate Student Standing, BMEN 311 or equivalent. (F;S)  
3.000 Credit hours

### **BMEN 785 - Selected Topics in Bioengineer**

This course includes selected Bioengineering topics of interest to students and faculty. The topics will be selected before the beginning of the course and will be pertinent to the programs of the students enrolled. Prerequisite: Graduate Student Standing. (F;S;SS)  
3.000 Credit hours

### **BMEN 792 - Master Seminar**

This course will introduce students to current government regulations, industry practices, global issues, project management approaches and current issues in bioengineering. Lectures will also include biomedical engineering ethics. External and internal speakers will be invited. Prerequisite: Graduate Student Standing. (F;S) Note: May be repeated for credit.  
0.000 Credit hours

### **BMEN 794 - Graduate Special Projects**

Study arranged on a special engineering topic of interest to student and faculty member, who will act as advisor. Topics may be analytical and/or experimental and encourage independent study. Prerequisites: Consent of instructor, M.S. Students only. (F;S;SS) Note: May be repeated for credit.  
1.000 TO 3.000 Credit hours

### **BMEN 796 - Master's Project**

A bioengineering project of interest to student and faculty member who will act as MS project advisor. Student is encouraged to develop skills in analytical or experimental research, innovative design or in-depth scholarly work. This course fulfills the MS capstone experience for students in the project option. Students must produce a written proposal and report. Prerequisites: Consent of instructor, Student must be in the MS Project Option. (F;S;SS)  
3.000 Credit hours

### **BMEN 797 - Master Thesis**

Master of Science thesis research will be conducted under the supervision of the thesis committee chairperson leading to the completion of the Master's thesis. This course is only available to thesis option students. Prerequisite: Graduate Student Standing in BMEN. (F;S;SS) Note: May be repeated for credit.  
1.000 TO 6.000 Credit hours

### **BMEN 799 - Continuation of Masters Thesis**

This course will enable masters students who have completed all required coursework and all project/thesis credits, to complete their project/thesis work. Prerequisite: Graduate Student Standing in BMEN. (F;S)  
1.000 Credit hours

## **BUED Business Education**

### **BUED 682 - Business Ed Planning and Lead**

This course focuses on the principles of effective planning, leadership and supervision of public school business education programs. It includes the foundations of career and technical education from the federal and state perspectives, as well as major issues, and trends in business education. Prerequisites:

Senior or Graduate standing or consultation with chairperson. (F)  
3.000 Credit hours

### **BUED 760 - Organizational Communication**

This course expands on the application of organizational communication theory, technologies, and philosophies to develop business communication expertise. Emphasis will be placed on critical thinking, interpersonal, and group communication skills in the global business context. Prerequisites: None. (S)  
3.000 Credit hours

### **BUED 790 - MAT Independent Study**

Intensive study, investigation, or research in a selected area of business education. Prerequisite: None. On Demand  
1.000 TO 3.000 Credit hours

## **CAAE Civil, Architectural & Environmental Engineering**

### **CAAE 654 - Facility Planning & Site Analy**

This course covers the land development process including zoning, site constraints, engineering administration, and site inventory and analysis. The analysis, planning, and design of transportation, drainage, potable waste, and sanitary sewer systems will be covered. Structural orientation and location, accessibility, site lighting, and provisions for power and communication services will be discussed. Other topics will include sedimentation and erosion control, site grading, project specifications and reviews by the appropriate agencies. Prerequisites: Senior standing or consent of instructor. (F)  
3.000 Credit hours

## CHEM Chemistry

### **CHEM 611 - Advanced Inorganic Chemistry**

This is a course in the theoretical approach to the systematization of inorganic chemistry. Prerequisite: CHEM 442. (F)  
3.000 Credit hours

### **CHEM 621 - Intermediate Organic Chemistry**

This course provides an in-depth examination of various organic mechanisms, reactions, structures, and kinetics. Prerequisites: CHEM 222 and CHEM 442. (F)  
3.000 Credit hours

### **CHEM 651 - General Biochemistry**

This is a study of modern biochemistry. The course emphasizes chemical kinetics and energetics associated with biological reactions and includes a study of carbohydrates, lipids, proteins, vitamins, nucleic acids, hormones, photosynthesis, and respiration. Prerequisites: CHEM 431, 442 and 451. (S)  
3.000 Credit hours

### **CHEM 652 - General Chemistry Lab**

This is a companion laboratory to CHEM 651. Experimentation will include isolation and characterization of biochemical substances and studies of physical properties. Students will be introduced to a variety of techniques including high performance liquid chromatography, electrophoresis, and centrifugation. Corequisite: CHEM 651. \*Students are required to purchase supplemental materials for these general education courses. (S)  
2.000 Credit hours

### **CHEM 663 - Chemical Instruction I**

A study of the curriculum and educational materials developed for use in the Thirteen

College Curriculum Program in Physical Science. (F;S)  
1.000 Credit hours

### **CHEM 664 - Selected Topics CHEM Inst II**

A continuation of Chemistry 663. (F;S)  
1.000 Credit hours

### **CHEM 673 - Intro Computational Chemistry**

### **CHEM 711 - Structural Inorganic Chemistry**

A study of the stereochemistry and electronic properties of inorganic substances. Emphasis will be placed upon applications of group theory and upon spectroscopic and physical methods.  
3.000 Credit hours

### **CHEM 715 - Spec Prob in Inorganic Chem**

A laboratory course designed to introduce the student to the techniques of chemical research by solving minor problems in Inorganic Chemistry. May be taken for credit more than once.  
1.000 Credit hours

### **CHEM 716 - Sel Topics in Inorganic Chemis**

A lecture course on advanced topics of inorganic Chemistry. Prerequisite: CHEM 611 or permission of the instructor.  
3.000 Credit hours

### **CHEM 722 - Advanced Organic Chemistry**

Recent developments in the areas of structural theory, stereochemistry, molecular rearrangement and mechanism of reactions of selected classes of organic compounds. Prerequisite: One year of Organic Chemistry of Chemistry 721.  
3.000 Credit hours



**CHEM 725 - Special Prob in Organic Chemis**

A laboratory course designed to introduce the student to the techniques of chemical research by solving minor problems in Organic Chemistry. May be taken for credit more than once.

1.000 Credit hours

**CHEM 726 - Selected Topics Organic Chem**

A lecture course on advanced topics in Organic Chemistry.

3.000 Credit hours

**CHEM 727 - Organic Preparations**

An advanced laboratory course. Emphasis is placed on the preparation and purification of more complex organic compounds.

Prerequisite: One year of Organic Chemistry.

1.000 TO 2.000 Credit hours

**CHEM 732 - Advanced Analytical Chemistry**

A lecture course in which the theoretical bases of Analytical Chemistry and their application in analysis will be reviewed with depth than is possible in the customary undergraduate courses. Equilibrium processes, including proton and electron transfer reactions and matter- energy interactions, will be considered.

Prerequisite: One year of Analytical Chemistry. (F;S)

3.000 Credit hours

**CHEM 743 - Chemical Thermodynamics**

An advanced course in which the laws of thermodynamics will be considered in their application to chemical processes.

Prerequisite: CHEM 442 or 742.

3.000 Credit hours

**CHEM 756 - Selected Topics in Biochemis**

A lecture course on advanced topics in Biochemistry.

3.000 Credit hours

**CHEM 794 - Supervised Research**

A course designed to permit qualified students to do original research in chemistry under the supervision of a senior staff member. May be taken for credit more than once. (F;S;SS) Note: May be repeated for credit.

2.000 TO 5.000 Credit hours

**CHEM 796 - Masters Project Research**

3.000 Credit hours

**CHEM 797 - Thesis Research**

A course designed for conducting thesis research under the supervision of the thesis committee chairperson leading to the completion of the master's thesis. This course is only available to thesis option students. Prerequisite: Permission of advisor.

3.000 Credit hours

**CHEM 799 - Continuation/Residency**

A course designed for conducting thesis research under the supervision of the thesis committee chairperson leading to the completion of the master's thesis. This course is only available to thesis option students. Prerequisite: Permission of advisor. Note: May be repeated for credit.

1.000 TO 6.000 Credit hours

**CHEN Chemical, Biological & Bioengineering**

**CHEN 605 - Biochemical Engineering**

This course explores the use of living organisms or parts of them (e.g., enzymes) for the production of chemical or biological materials. The course emphasis is upon bioreactor design. Topics covered include enzyme kinetics and biocatalysts, microbial

growth and product formation, immobilization of enzymes and whole cells, bioreactor scale-up and design of batch and continuous bioreactors, heat and mass transfer in bioreactors, bioproduct recovery, and bioprocess design and modeling. Students are required to complete a bioprocess design and a project on a topic of national and/or international significance. Prerequisites: Graduate standing in CHEN or consent of instructor. (F;S)  
3.000 Credit hours

### **CHEN 608 - Bioseparations**

#### **Fundamentals**

The course deals with fundamentals of bioseparation processes which are characterized as removal of insolubles, isolation of products, and purification or polishing. Processes covered include filtration, centrifugation, cell disruption, extraction, absorption, elution chromatography, precipitation, ultrafiltration, electrophoresis and crystallization. Students are required to complete a design project on a bioseparation process. Prerequisites: Graduate standing in CHEN or consent of instructor. (F;S)  
3.000 Credit hours

### **CHEN 615 - Energy and Fuels**

#### **Fundamentals**

Topics important to the exploration, production and processing of fuels are covered. Types of fuels covered include fossil fuels, synfuels, and fuels from renewable resources, such as, wind, solar and biomass. Students learn about processing of fuels by distillation, refining, fermentation, catalytic reactions, and removal of undesirable by-products. The design of fuel processes includes emphasis on economic and environmental impact. Prerequisites: Graduate standing in CHEN or consent of instructor. (F;S)  
3.000 Credit hours

### **CHEN 618 - Air Pollution Control**

The economic, social and health implications of air pollution and its control are covered. To understand the problems better, the sources, types and characteristic of man-made air pollutants will be discussed. The course will review some of the main regulations and engineering alternatives for achieving different levels of control. An air pollution control system will be designed. Prerequisite: Graduate standing in CHEN or consent of instructor. (F;S)  
3.000 Credit hours

### **CHEN 660 - Selected Topics in CHEN**

Topics covered include selected chemical engineering topics of interest to students and faculty. The topics will be selected before the beginning of the course and will be pertinent to the programs of the students enrolled.  
3.000 Credit hours

### **CHEN 665 - Fundamentals of Polymer Engi**

This course involves a treatment of engineering and technology of polymeric materials. Students learn about control of significant variables in polymer synthesis, and physical methods for characterization of molecular weight, morphology, rheology and mechanical behavior. Engineering applications include additives, blends and composites, natural polymers and fibers, thermoplastics, elastomers and thermosets, polymer degradation and stability, polymers in the environment, and polymers for advanced technologies, such as, membrane separations, biomedical devices, electronic and photonic industry. Prerequisites: Graduate standing in CHEN or consent of instructor. (F;S)  
3.000 Credit hours

### **CHEN 666 - Special Projects in CHEN**

Study is arranged on a special chemical engineering topic of interest to both the student and faculty member, who will act as supervisor. Topics may be analytical and/or experimental and should encourage independent study. Prerequisite: Consent of instructor.

1.000 TO 3.000 Credit hours

### **CHEN 670 - Solids Process and Parti Tech**

This course provides the fundamentals of solids processing and particle technology. Topics included are properties of particles, transport of particles, size reduction, size enlargement, filtration, centrifugation, clarification, drying of solids, crystallization, flotation, and safety hazards of fine powders. Industrial examples will be emphasized. Prerequisite: Graduate standing in CHEN or consent of instructor. (F;S)

3.000 Credit hours

### **CHEN 705 - Transport Phenomena I**

This course presents a unified treatment of momentum, energy and mass transport with an emphasis on the microscopic approach. Students learn to develop and solve differential transport equations with defined boundary conditions, and apply this knowledge for solution of some simple chemical process problems. Prerequisites: Graduate standing in CHEN or consent of instructor. (F;S)

3.000 Credit hours

### **CHEN 715 - Advanced Chemi Engi Analy**

In this course students learn how to solve chemical engineering problems by advanced mathematical techniques. The topics covered include uncoupled and coupled momentum, heat and mass transfer problems, matrix analysis of linearized dynamic equations representing stage operations, and advanced design and optimization of chemical processes.

Prerequisites: Graduate standing in CHEN or consent of instructor. (F;S)

3.000 Credit hours

### **CHEN 720 - Adv Chem Reaction Engineering**

This course includes an advanced treatment of chemical reaction engineering including effect of non-ideal flow and fluid mixing on reactor design, as well as multi-phase reaction system and heterogeneous catalysis and catalytic kinetics. (F;S)

3.000 Credit hours

### **CHEN 750 - Separation Processes**

Differential and equilibrium stage operations involving non- isothermal and multi-component systems are covered. Other topics covered include simultaneous mass transfer and chemical reaction and dispersion effects. Applications to operations such as absorption, extraction, chromatography, distillation, ion exchange, and membrane separation are also studied. (F;S)

3.000 Credit hours

### **CHEN 760 - Adv Chem Engr Thermodynamics**

This is an advanced course covering topics in molecular thermodynamics of fluid phase equilibria. Statistical thermodynamics and thermodynamics of nonequilibrium processes are introduced. (F;S)

3.000 Credit hours

### **CHEN 789 - Special Topics**

A course design to allow the introduction of potential new courses on a trial basis or offering of special course topics on a once only basis. The course may be offered to individuals or groups of students. A definite topic and the title must be agreed upon by the advisor before the student registers for the course.

1.000 TO 3.000 Credit hours

**CHEN 792 - Master's Seminar**

This course provides a forum for the presentation and discussion of selected topics of interest to chemical engineering graduate students such as faculty research interests, communication, safety, job prospects and research results. Prerequisites: None. (F;S)  
0.000 Credit hours

**CHEN 794 - Master Supervised Research**

This course is supervised research under the mentorship of a faculty member. It is not intended to serve as the project nor thesis topic of the masters students.  
3.000 Credit hours

**CHEN 796 - Master's Project**

This is an independent project involving research or design in an area of interest to the instructor and the student. This course must be completed by, and only by, Master of Science in Chemical Engineering project option students. A written proposal and a report is required. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

**CHEN 797 - Master's Thesis**

3.000 Credit hours

**CHEN 799 - Continua of Master's Thesis**

This is a continuation course for Master's thesis. Prerequisite: Graduate standing in CHEN. (F;S;SS) Note: May be repeated for credit.  
1.000 Credit hours

**CIEN Civil, Architectural & Environmental Engineering****CIEN 614 - Stream Water Quality Modeling**

This course includes mathematical modeling of water quality in receiving streams. Topics

include the generation of point and nonpoint sources of pollutants, modeling and prediction of the reaction, transport and fate of pollutants in the stream, and the formulation and solution of simulation models. Prerequisite: CIEN 410. (DEMAND)  
3.000 Credit hours

**CIEN 616 - Solid Waste Management**

This course emphasizes the study of the collection, storage, transport and disposal of solid wastes. Examination of various engineering alternatives with appropriate consideration for air and water pollution control and land reclamation are considered. Prerequisite: Senior or graduate standing. (DEMAND)  
3.000 Credit hours

**CIEN 620 - Foundation Design I**

This course will introduce the following topics: behavior and design of retaining walls and shallow foundations, earth pressure, bearing capacity and settlement, stress distribution and consolidation theories, and settlement of shallow foundations. Prerequisite: CIEN 520. (DEMAND)  
3.000 Credit hours

**CIEN 640 - Advanced Structural Analysis**

This course emphasizes the more complex concepts of structural analysis for determinate and indeterminate structural systems using both hand calculations and computer software. Prerequisite: CAAE 325. (F;S)  
3.000 Credit hours

**CIEN 658 - Pavement Design**

This course is the study of the design of highway and airport pavement structures. Topics include flexible and rigid pavement, cost analysis and pavement selection, drainage, earthwork, pavement evaluation

and maintenance. Prerequisite: CIEN 350.  
(DEMAND)  
3.000 Credit hours

**CIEN 670 - Construction Engin & Mgmt**

This course concentrates on the solution to problems in construction engineering and management. A variety of problems from the construction industry are presented to the students. The students form teams to develop solutions to these problems. Topics vary with available projects and student interest. Graduate students select a project in their area of interest for intensive study and submit a report. Prerequisite: Senior or graduate standing. (DEMAND)  
3.000 Credit hours

**CIEN 699 - Special Projects**

This course provides study arranged on a special civil engineering topic of interest to the student and faculty. Topics may be analytical and/or experimental with independent study encouraged. Prerequisite: Consent of instructor. Note: May be repeated for credit.  
3.000 Credit hours

**CIEN 700 - Emerging Technologies in CIEN**

Provides an overview of the applications of emerging technologies (such as decision support systems and Geographic Information Systems) in civil engineering. The students are required to complete a project which includes the design and implementation of one of the types of systems covered in the course.  
3.000 Credit hours

**CIEN 702 - CIEN Systems Analysis**

Introduces mathematical modeling techniques for the solution of civil engineering problems. These include the formulation of mathematical representation of complete civil engineering systems and

their evaluation via linear programming, dynamic programming and the use of formal heuristics. Multiobjective analysis, project management and civil engineering planning and design are also presented.  
3.000 Credit hours

**CIEN 735 - Wind & Earthquake Design**

3.000 Credit hours

**CIEN 754 - Modeling of Trans Systems**

This course is concerned with the development and use of system models associated with transportation decision making. The modeling techniques that will be used are the following: multiple  
3.000 Credit hours

**CIEN 758 - Emerg Techniques in CIEN**

3.000 Credit hours

**CIEN 785 - Selected Topics**

Allows a student to select a civil engineering topic of interest to the student to investigate in depth. The topic will be selected by the student and a faculty advisor before the beginning of the semester. The topic must be pertinent to the study program of the student and must be approved by the faculty advisor. Note: May be repeated for credit.  
3.000 Credit hours

**CIEN 786 - Special Projects**

Student must select a project on a special civil engineering topic of interest to the student and a faculty member, who will act as an advisor. The student and faculty advisor must agree upon the project and scope of work before the beginning of the semester. The project may be analytical and/or experimental and encourage independent work. The topic must be pertinent to the program in which the student is enrolled and approved by the faculty advisor. (F;S) Note: May be repeated for credit.

3.000 Credit hours

**CIEN 792 - CIEN Masters Seminar**

Discussion and presentations of reports of subjects in Civil Engineering and allied fields are included. Prerequisites: Graduate Standing. (F;S)

1.000 Credit hours

**CIEN 793 - Masters Supervised Teaching**

Students will gain teaching experience under the mentorship of faculty who assist the student in planning for the teaching assignment, observe and provide feedback to the student during the teaching assignment, and evaluate the student completion of the assignment.

3.000 Credit hours

**CIEN 796 - Masters Project**

The student will conduct advanced research of interest to the student and the instructor. A written proposal, which outlines the nature of the project, must be submitted for approval. This course is only available to project option students. 100

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3.000 Credit hours

**CIEN 797 - Masters Thesis**

Master of Science thesis research will be conducted under the supervision of the thesis committee chairperson leading to the completion of the Master's Thesis. This course is only available to thesis option students. Note: May be repeated for credit.

3.000 TO 6.000 Credit hours

**CIEN 799 - Con't of Thesis for CIEN**

This optional course allows the student to maintain full-time enrollment status after the completion of the Masters' Project (CIEN 796) or Masters' Thesis (CIEN 797) credit-hour requirements. The course may also be taken to allow the student time to complete a

Masters' project, thesis write-up and preparation for Masters' project or thesis defense. Completion of all required course work and Masters' project or thesis credit-hour requirements. (F;S) Note: May be repeated for credit.

1.000 Credit hours

**CM Built Environment**

**CM 617 - Independent Studies I**

Study is arranged on a special construction topic of interest to the student and faculty member, who will act as advisor. Consent of Instructor Required. (F;S;SS)

3.000 Credit hours

**CM 618 - Independent Study II**

Study is arranged on a special construction topic of interest to the student and faculty member, who will act as advisor. Consent of Instructor Required. (F;S;SS)

3.000 Credit hours

**CM 708 - Constr Cost Esti and Proj Con**

This course focuses on estimating techniques and various cost control measures used in construction industry. Topics to be covered include: conceptual, budget, and definitive estimates; work break down structure; bidding strategies; computer applications; and cost analysis techniques. Also, the course addresses the impacts of cost control measures on construction productivity. Prerequisites: CM 371 or Consent of Instructor. (F;S;SS)

3.000 Credit hours

**CM 764 - Risk Management in Construc**

This course provides an in-depth study of various risks associated with construction projects and how those risks impact the construction industry. Topics of discussion will include analytical and management techniques used to identify, analyze and respond to risks. Students will review actual

legal case studies and develop written opinion papers. Prerequisites: Graduate Standing. (F;S;SS)  
3.000 Credit hours

## **COMP Computer Science**

**COMP 620 - Information, Privacy & Security**  
3.000 Credit hours

**COMP 621 - Web Security**  
3.000 Credit hours

**COMP 681 - Formal Methods**  
In this course, formal methods that model the software development process will be studied. Fundamental and practical methodologies and theories, including set theory and the foundations of software engineering will be emphasized. Applications to formal specifications, object-oriented programming and data modeling will be examined. Topics include set theory, relations and functions, induction and recursion, symbolic logic, complex models, and application case studies. (S)  
3.000 Credit hours

**COMP 710 - Specifications and Design**  
This course examines the formalization of software requirements and the analysis of the flow of data through a proposed large software system. Methodologies covered include Structured Analysis (data flow diagramming), hierarchy charts, entity-relationship data diagrams, procedure specifications, and Information Engineering. Additional methodologies addressed include Jackson Structured Diagrams, Harlan Black Boxes, and Object-Oriented Analysis techniques. Prerequisite: Graduate standing.  
3.000 Credit hours

**COMP 725 - Software Security Testing**

This course focuses on software security testing techniques and tools. It covers security testing techniques such as code reviews and static analysis, creating test plans based on risk analysis, black-box, white-box and gray-box security testing and fault injection. Security testing tools will be introduced. Prerequisite: Graduate Student Standing. (F;S;SS)  
3.000 Credit hours

**COMP 726 - Network Security**  
The course covers various aspects of securing data during their transmission. It includes the following topics: vulnerabilities in software and hardware systems; cyber attack methods and their defense mechanisms; symmetric ciphers; public key ciphers; hash functions; message authentication and digital signature; public key infrastructure and web of trust; email security; web security; IPSec; firewall; intrusion detection system. Prerequisite: Graduate Standing. (F;S;SS)  
3.000 Credit hours

**COMP 727 - Secure Software Engineering**  
This course discusses how to incorporate security throughout the software development lifecycle. The main topics include threats to the software, software vulnerabilities, risk management, security requirements, secure design principles and patterns, an overview of secure programming and security testing. Prerequisite: Graduate student standing. (F;S;SS)  
3.000 Credit hours

**COMP 755 - Advanced Operating Systems**  
This course centers on operating systems for multi- processing environments: concurrent processes, mutual exclusion, job scheduling, memory, storage hierarchy, file systems,

security, and distributed processing. Also discussed are virtual resources management strategies. A design project involving the construction of operating facilities is produced. Prerequisite: Graduate standing. 3.000 Credit hours

### **COMP 765 - Data Mining**

The theory of data mining is presented as well as applications of its principles in industry. This course covers the basics of techniques and applications such as cluster detection, market basket analysis, decision tree derivation, genetic algorithms, artificial neural networks, memory-based reasoning and data warehouses. Students learn a variety of algorithms for discovering meaningful patterns and rules in large quantities of data. Prerequisites: NONE. (F;S;SS) 3.000 Credit hours

### **COMP 775 - Advance Design Analysis Algori**

This course discusses the design and analysis of efficient algorithms and algorithmic paradigms. Applications include sorting, searching dynamic structures, graph algorithms, computationally hard problems, and NP completeness. Prerequisite: None. (F;S) 3.000 Credit hours

### **COMP 790 - Spec Topics in Comp Science**

This course can be used for study of advanced topics in computer science pertinent to the student's interest under supervision of a faculty member. Prerequisites: None. (F;S) Note: May be repeated for credit. 3.000 Credit hours

### **COMP 796 - Master's Project**

The student will conduct advanced research of interest to the student and the instructor.

A written proposal, which outlines the nature of the project and the deliverables, must be submitted for approval. This course is only available to project option students. Prerequisite: Graduate standing. 3.000 Credit hours

### **COMP 797 - Master's Thesis**

Master of science thesis research will be conducted under the supervision of the thesis committee chairperson leading to the completion of the master's thesis. This course is only available to thesis option students. Prerequisite: Permission of advisor. Note: May be repeated for credit. 1.000 TO 6.000 Credit hours

### **COMP 799 - Continuation of Research**

Note: May be repeated for credit. 1.000 Credit hours

### **COMP 851 - Big Data Analytics**

This course provides a basic understanding of big data analytics and data science. The course also focuses on various advanced large-scale data analytic methods and tools required to handle vast amounts of unstructured data produced daily by users and systems in various fields. Prerequisites: None. (F;S) 3.000 Credit hours

### **COMP 872 - Social Semantic Web**

This course covers the use of concepts and techniques from the Semantic Web used to facilitate social computing and the establishment and maintenance of online social networks. It also addresses emerging standards and ontologies related to social networks. Prerequisites: Graduate Standing. (F;S;SS) 3.000 Credit hours

### **COMP 881 - Advanced Multiagent Systems**



This course addresses the key concepts behind multiagent systems, including logical foundations, topics from microeconomics (including game theory and negotiation), and topics from the social sciences more generally. It also addresses problem solving protocols and inter-agent communication and collaboration. Prerequisite: COMP 786. (F;S;SS)  
3.000 Credit hours

**COMP 892 - Doctoral Research Methods**  
Students are taught research techniques and the skills for writing publishable papers. Prerequisite: COMP 991. (F;S;SS)  
3.000 Credit hours

**COMP 895 - Doctoral Special Topics**  
This course introduces computer science topics of current interest. Prerequisites: Doctoral Standing and Consent of Instructor. (F;S;SS) Note: May be repeated for credit.  
3.000 Credit hours

**COMP 991 - Doctoral Qualifying Examina**  
This is a supervised program for students who are preparing for the written qualifying examination and should be taken the semester before the student takes that examination. Prerequisites: Doctoral Standing and Consent of Advisor. (F;S;SS)  
0.000 Credit hours

**COMP 993 - Doctoral Supervised Teaching**  
This course will introduce the student to classroom teaching under the guidance of a faculty member. The student will gain experience in course planning, lecture preparation, classroom teaching, and student evaluation. Prerequisite: Doctoral Standing. (F;S;SS)  
3.000 Credit hours

**COMP 994 - Doctoral Research Examination**  
This is required for students who have completed the doctoral qualifying examination and who are taking the written in-depth examination during the semester. This is a supervised program to help prepare the student for that examination under the mentorship of the academic advisor. Upon passing without conditions or after fulfilling any conditions specified by the student's PH.D. advisory committee, the doctoral student is admitted to candidacy. Prerequisites: COMP 892 and Consent of Advisor. (F;S;SS)  
3.000 Credit hours

**COMP 995 - Doctoral Preliminary Examina**  
This is required for students who have completed the doctoral qualifying examination and who are taking the preliminary examination (oral preliminary defense) during the semester. This is a supervised program to help prepare the student for the preliminary examination under the mentorship of the academic advisor. Prerequisite: COMP 994. (F;S;SS)  
3.000 Credit hours

**COMP 997 - Doctoral Dissertation**  
This supervised research leads to the dissertation of the doctoral student. Eighteen credits of dissertation are required for graduation. Prerequisite: COMP 995 and Consent of Advisor. (F;S;SS) Note: May be repeated for credit.  
3.000 TO 18.000 Credit hours

**COMP 999 - Continued Residency**  
Note: May be repeated for credit.  
1.000 TO 3.000 Credit hours

## **COUN Counseling**

**COUN 702 - Human Development**

This course provides a comprehensive look at human development from neonatal development to death. The psycho-social, physical, and cognitive aspects of development at every stage are studied in depth, as are various developmental theories describing growth and maturation. Students emerge with a complete understanding of human development across the lifespan and are able to use this knowledge to facilitate the optimum development of people in their future counseling work. A grade of B or better is required in this course.

Prerequisites: None. (F;S;SS)

3.000 Credit hours

### **COUN 704 - School Counseling**

This course covers aspects of counseling as they apply to school settings. Prerequisite: None. (F;S;SS)

3.000 Credit hours

### **COUN 705 - Internship Experience in Human Development**

This course focuses on increasing student's awareness and understanding of cultural diversity and social justice in international counseling and educational settings. This course is a faculty led study abroad experience which includes learning activities and immersion experiences. Prerequisites: COUN 702 or ADED 707 or MSA 778 or Permission of instructor. (F;S;SS)

3.000 Credit hours

### **COUN 707 - Professional Ethics in Clinical Mental Health**

This course provides an introduction to the field of clinical mental health counseling. Historical foundations, ethical and legal standards, professional organizations and credentialing, and current trends of the profession are also discussed as well as mental health counseling roles, treatment models, and delivery systems. Prerequisites: None. (F;S;SS)

3.000 Credit hours

### **COUN 708 - Professional Ethics in Rehabilitation Counseling**

This course explores the field of clinical rehabilitation counseling including a history and philosophy of rehabilitation, legislation affecting individuals with disabilities, organizational structure of the rehabilitation systems, and rehabilitation counseling practice. Ethics, standards, and credentialing for professional rehabilitation counselors is also presented in this course. A grade of B or better is required in this course.

Prerequisites: None. (F;S;SS)

3.000 Credit hours

### **COUN 709 - Statistics and Research Method**

This course addresses advanced statistical methods and the tools of research.

Prerequisite: None. (F;S;SS)

3.000 Credit hours

### **COUN 710 - Professional Ethics in Counseling**

This course addresses ethics, standards, and credentials for professional counselors with emphasis on the standards of the American Counseling Association and the American School Counselor Association. A grade of B or better is required in this course.

Prerequisites: None. (F;S;SS)

3.000 Credit hours

### **COUN 712 - Counseling School Age Children**

This course examines how counselors can be effective in addressing the developmental, mental, and psychological needs of elementary, middle, and high school students. A grade of B or better is required for this course. Prerequisites: COUN 713.

(F;S;SS)

3.000 Credit hours

### **COUN 713 - Theories and Methods in Counseling**

This course introduces the primary theories and techniques in the field of counseling and their underlying components. Laboratory experiences for the observation and application of these counseling skills is provided. A grade of B or better is required in this course. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

#### **COUN 714 - Counseling Exceptional Children**

This course will examine the assessment and placement needs of exceptional children in the school setting and explore strategies for counseling and guidance. Prerequisite: COUN 713. (F;S;SS)  
3.000 Credit hours

#### **COUN 716 - Foundations and Theories of Addiction**

This course introduces students to a wide range of theories and models of addiction, culturally competent treatment practices, and other topics related to addictions including, but not limited to, alcohol and other drug abuse, gambling addiction, sex addiction, eating disorders, and criminal offense. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

#### **COUN 717 - Trauma, Grief, Loss in K-12 Schools**

This course will explore the school counselor roles and responsibilities in relation to the school emergency management plans, and crises, disasters, and trauma. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

#### **COUN 721 - Human Sexuality**

This course is an overview of the clinical study of human sexuality. Sexual and psychosexual development, sexual health and disease, sexual dysfunctions, and cultural norms are discussed. Counseling best practices are also emphasized.

Prerequisites: None. (F;S;SS)  
3.000 Credit hours

#### **COUN 728 - Counseling Women and Girls**

This course is a foundational course for aspiring counselors who have a desire to provide counseling services to adolescent females and women. Students will be offered an overview of appropriate counseling theories and practices and the course will examine various social, political, economic, and cultural issues that impact women and families. Prerequisite: COUN 713. (F;S;SS)  
3.000 Credit hours

#### **COUN 731 - Addiction in the Workplace**

This course will focus on addiction and the impact that it has on employment including the role of Employee Assistance Programs. Students will learn the importance of EAP programs, the history of EAP programs, and how working with clients on substance abuse and co-occurring disorders can impact employment. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

#### **COUN 732 - Integrating Spirituality in Counseling**

This course explores spirituality as a component of a holistic approach to counseling to include finding meaning in challenging situations and hope for a better life. The history of spirituality and the orientations of various religious groups will be explored. Counselors will enhance their orientation to spirituality as it relates to a continuum of care. Prerequisite: COUN 713. (F;S;SS)  
3.000 Credit hours

#### **COUN 733 - Trauma Theory and Treatment**

This course will provide an introduction to theoretical frameworks of trauma throughout the life span. Types of trauma, the history of

tramatology, and the impact of trauma on the individual, family, and community will be examined. Treatment methods and evidenced-based practices will be provided. Prerequisite: COUN 765. (F;S;SS)  
3.000 Credit hours

### **COUN 735 - Counseling Methods**

The fundamentals of general counseling skills are addressed as a foundation for further study. This course includes laboratory experiences for the observation and application of counseling skills. A grade of B or better in this course is required. Prerequisites: Completion of the Personal Counseling Requirements and COUN 713 and (COUN 708 or COUN 710). (F;S;SS)  
3.000 Credit hours

### **COUN 736 - Multicultural Counseling**

This course provides an overview of issues and trends for counselors in a diverse society. A grade of B or better is required for this course. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **COUN 737 - Counsel Older Adults Agi Fami**

This course focuses on the rapidly aging American population and the counseling-related challenges of individuals and families in later life. Students will complete a service learning project. Prerequisite: COUN 735. (F;S;SS)  
3.000 Credit hours

### **COUN 738 - Psy Treat Plan Reha Counseling**

This course provides a comprehensive analysis of the Diagnostic and Statistical Manual (DSM) for report-writing and treatment plan development in rehabilitation counseling settings. Accepted treatment approaches and outcome-based assessments are evaluated. Prerequisite: None. (F;S;SS)

3.000 Credit hours

### **COUN 740 - Appraisal**

This course will introduced evaluation and assessment tools, including relevant statistics and computer applications. A grade of B or better is required in this course. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **COUN 743 - Medi and Psycho Aspects of Dis**

This course is an orientation to the characteristics of a range of medical and psychological disabilities and their psychological, social, familial, and vocational implications. It explores medical terminology, common diagnostic procedures, and the role of health professionals. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **COUN 750 - Group Counseling**

Theories, techniques, and procedures appropriate for counseling groups will be included, as well as topics to build understanding of group development and dynamics. This course includes laboratory experiences for observation and application of group counseling skills. A grade of B or better is required in this course. Prerequisites: COUN 713. (F;S;SS)  
3.000 Credit hours

### **COUN 753 - Play Therapy**

This course will introduce students to theories and techniques related to counseling children and adolescents with an emphasis on play and creative therapies. Prerequisite: COUN 713. (F;S;SS)  
3.000 Credit hours

### **COUN 754 - Ad Theo Prac in Fam Counseling**

This course focuses on selected emerging family systems theories with an emphasis on

the cognitive behavioral approach and the respective techniques and assessments.

Prerequisite: COUN 763. (F;S;SS)

3.000 Credit hours

### **COUN 756 - Counseling Couples**

This course will examine the relationships of couples, their role in the family system and evidenced based theories and techniques for effective counseling. Prerequisite: COUN 763. (F;S;SS)

3.000 Credit hours

### **COUN 758 - Psychopa Diagnosis and Treat**

This course familiarizes students with psychopathology and clinical evaluation using the most recent edition of the DSM and ICD classification systems, as well as other diagnostic tools. There is an additional emphasis on case conceptualization, biopsychosocial treatment planning, continuum of care, pharmacological interventions, and the impact of diversity, crisis, and trauma on the assessment and treatment processes. Prerequisites: COUN 704 or COUN 707 or COUN 708. (F;S;SS)

3.000 Credit hours

### **COUN 759 - Addictions Counseling**

This course will examine multiple components of substance use and addictive disorders including etiology, assessment, treatment models, and preventive clinical mental health settings. There is an emphasis on the major substances and behaviors of addiction, diverse populations, co-occurring disorders/illnesses, and social-cultural implications of addictions. Prerequisite: COUN 713. (F;S;SS)

3.000 Credit hours

### **COUN 760 - Career Counseling**

This course includes career development theories, applied and related counseling procedures and technological applications.

This course includes laboratory experiences for observation of and practice in career counseling. A grade of B or better is required in this course. Prerequisites: COUN 713. (F;S;SS)

3.000 Credit hours

### **COUN 761 - Behavioral Medicine**

This course explores the utilization of behavioral health techniques to treat a variety of medical and behavioral health conditions. There is an emphasis on the treatment of conditions that are associated with habits and lifestyle, as well as medical conditions that are exacerbated by stress and other psychological factors. Prerequisite: None. (F;S;SS)

3.000 Credit hours

### **COUN 763 - Family Counseling**

This course discusses the history, philosophy, professional issues, and trends in family counseling with an emphasis on the roles and functions, models and theories, and ethical and legal considerations of the counselor working with families. In addition, family development across the lifecycle, families in crisis, and specific issues facing families are examined.

Prerequisites: COUN 735. (F;S;SS)

3.000 Credit hours

### **COUN 764 - Caseload Manage Voca Planning**

This course covers the case management process (including case finding, service coordination, referral to and utilization of the other disciplines and client advocacy), planning for the provision of independent living services, vocational rehabilitation services, computer applications, and technology for caseload management.

Prerequisite; COUN 708. (F;S;SS)

3.000 Credit hours

**COUN 766 - Ad Clin Mental Health Counsel**

This course is a laboratory course with a focus on culturally responsive principles of mental health counseling including prevention, intervention, consultation, education, advocacy, and crisis management. Students have the opportunity to demonstrate skill related areas. Students also learn about clinical mental health service delivery, program development and management, and the importance of policy and community support systems to treatment. Prerequisites: COUN 713. (F;S;SS)  
3.000 Credit hours

**COUN 767 - Psychopathology and Addictions**

This course will familiarize students with criteria, co-morbidity rates, co-existing disorders, and issues of differential diagnosis based on the Diagnostic and Statistical Manual (DSM). Various behavioral addictions will be explored within a cultural framework. Prerequisites: COUN 738. (F;S;SS)  
3.000 Credit hours

**COUN 768 - Psychopharm Addictive Behav**

This course addresses the ways in which alcohol and other addictive substances affect the brain and behavior. Addictions addressed include, but are not limited to, alcohol and other drug abuse, gambling addiction, sex addiction, eating disorders, and criminal offense. This course will also explore the different classes of drugs and the associated street names for each drug. Prerequisites: COUN 743. (F;S;SS)  
3.000 Credit hours

**COUN 769 - Marriage Fam Counsel Addiction**

This course will introduce the student to systems theory and the effects of the cycle of addictions on the family. The specific addictions addressed include, but are not limited to, alcohol and other drug abuse, gambling addiction, sex addition, eating disorders, and criminal offense. Culturally relevant values and practices in providing services to the family will also be addressed. Prerequisites: COUN 750. (F;S;SS)  
3.000 Credit hours

**COUN 770 - Applied Research in Counseling**

This course focuses on research design and the elements of empirical research including the hypothesis, review of literature, methodology, data collection, and statistical analysis relevant to empirical research. Research culminates in a technical research report. A grade of B or better is required in this course. Prerequisites: COUN 740. (F;S;SS)  
3.000 Credit hours

**COUN 771 - Foundations of Vocational Eval**

This course will explore the basic philosophies, practices, and processes of vocational evaluation when working with individuals with disabilities. Specific topics will include assessment tools and instruments, refinement of clinical skills, analysis of information for career planning, and identification of relevant behaviors. Prerequisite: COUN 740. (F;S;SS)  
3.000 Credit hours

**COUN 774 - Coun Poor and Eth Diverse Fami**

This course will introduce students to sociocultural issues impacting families, the historical and political context of their dilemmas, and strategies for intervention in contemporary society. Emphasis will be placed on understanding ethnicity and

socioeconomic status. Prerequisites: COUN 763. (F;S;SS)  
3.000 Credit hours

### **COUN 775 - Career Counseling Employ Devel**

This course provides an overview of career development theory, psychological assessment for career planning, and sources and uses of career information in counseling. Cutting edge strategies for job development and placement, employer consultation, vocational planning and assessment, and computer-based assessment tools will be explored. Prerequisite: COUN 708. (F;S;SS)  
3.000 Credit hours

### **COUN 778 - Psychodiagnos Report Writing**

This course focuses on the application of the psychodiagnostic process of individuals with cognitive and social-emotional problems, including psychopathological problems. This course includes the administration and scoring of selected psychological assessment instruments; the interpretation of results from these instruments; and the ability to write an integrative report of test findings. Prerequisite: COUN 740. (F;S;SS)  
3.000 Credit hours

### **COUN 784 - Counseling Practicum**

This is a laboratory course in which students will engage in a 100 clock hours supervised practice in the use of counseling skills. Prerequisites: COUN 713. Corequisite: COUN 750. (F;S;SS)  
3.000 Credit hours

### **COUN 785 - Internship**

This course requires three hundred (300) clock hours of supervised internship in an appropriate field placement. Students must apply to take this course one semester before enrollment. Class meetings are scheduled

and announced by the professor. Individual conferences will be required. All required courses by track must be completed before enrolling in this course. A grade of B or better is required. Prerequisite: COUN 784. (F;S;SS)  
3.000 Credit hours

### **COUN 786 - Internship II**

Three hundred (300) clock hours of advanced supervised in appropriate counseling setting required. Students must apply to take this course one semester before placement. Class meetings are scheduled and announced by the professor. Individual conferences are required. All required courses by track must be completed before enrolling in this course. A grade of B or better is required in this course. Prerequisites: COUN 784, COUN 785. (F;S;SS)  
3.000 Credit hours

### **COUN 790 - Independent Study**

With the supervision of an approving professor, a student may carry out a special project of particular interest, which has appropriate relationship to his counseling specialization. Students must apply for and obtain approval of the supervising professor and the department chairperson one semester before registering for this course. The work of the course must be submitted in the form of a written report. Prerequisite: None. (F;S;SS) Note: May be repeated for credit.  
1.000 TO 3.000 Credit hours

### **COUN 800 - Advanced Pro Ori Ethic in Reha**

This professional course explores central professional, legal, and ethical issues surrounding contemporary counseling practice. The counselor's leadership and advocacy roles are stressed, topics include: gender, ethnicity, religion, spirituality,

disability, guild issues, and utilizing the legislative process to better serve clients.

Prerequisite: None. (F;S;SS)

3.000 Credit hours

### **COUN 802 - Advanced Multicul Counsel Dis**

This professional course examines theories, research, and pedagogy and best practices for counseling culturally different clients. Exploration of cultural biases in existing counseling theories and current research is facilitated throughout this experience.

Prerequisites: None. (F;S;SS)

3.000 Credit hours

### **COUN 810 - Descriptive and Inferen Statis**

This doctoral level statistics course equips students with the principles of descriptive and inferential statistics and the essential concepts for developing and analyzing statistical research designs. Additionally, students acquire skills in hypothesis testing, analysis of variance, nonparametric statistics, and simple linear prediction.

Prerequisite: None. (F;S;SS)

3.000 Credit hours

### **COUN 812 - Instructional Theory and Meth**

This course prepares students to become culturally competent counselor educators. Adult learning theories, diverse learning styles, cultural dynamics, and diversity in the counseling profession are explored.

Prerequisite: COUN 800. A minimum grade of "B" must be earned. (F;S;SS)

3.000 Credit hours

### **COUN 815 - Multivariate Anal in Research**

This course provides students with an introduction to common multivariate statistical analyses as applied to research in education and the social sciences.

Prerequisite: COUN 810. (S)

3.000 Credit hours

### **COUN 818 - Theory and Prac of Couns Super**

This course explores the major conceptual approaches, counseling methods, culturally competent techniques, and legal and ethical issues related to clinical supervision for counselors and counselors in training.

Prerequisite: COUN 800. (F;S;SS)

3.000 Credit hours

### **COUN 825 - Grant Writing**

Students are equipped with effective tools to identify, understand, write, and manage available grants. Prerequisite: None.

(F;S;SS)

3.000 Credit hours

### **COUN 830 - Design Methodology and Imple**

This research course provides students with core knowledge and skills for understanding, analyzing, and designing research at the doctoral level using quantitative, qualitative, and mixed method research designs.

Prerequisites: COUN 815. (SS)

3.000 Credit hours

### **COUN 850 - Foun of Trau Inform Care Manag**

This course prepares students to learn about the prevalence of different types and diagnostic criteria for trauma across populations and the fundamental aspects of trauma informed care as a best practice philosophy to counseling and service provision. Prerequisite: None. (F)

3.000 Credit hours

### **COUN 860 - Family Violence**

This course provides clinical theory on the assessment and treatment of different forms of family violence (e.g., child maltreatment, intimate partner violence, adult survivors of



abuse) from a trauma-informed care perspective. Safety planning and treatment modalities, including when to use single versus conjoint treatment, are reviewed in detail so that students are well-equipped to address these issues in their places of employment. Prerequisite: COUN 850. (F;S;SS)  
3.000 Credit hours

### **COUN 865 - Analysis of Qualita Research**

This course explores advanced principles of qualitative research and approaches in counseling and development, including grounded theory, phenomenology, case study, and ethnography. Additionally, students will engage in central concepts, issues, dilemmas, and ethical issues associated with qualitative research. Prerequisites: COUN 830. (F;S;SS)  
3.000 Credit hours

### **COUN 870 - Models and Meth of Assessment**

This course addresses needs assessment, formative research, process evaluation, monitoring of outputs and outcomes, impact assessment, experimental, quasi-experimental, and non-experimental study designs. A minimum grade of "B" must be earned. Prerequisites: COUN 830. (F;S;SS)  
3.000 Credit hours

### **COUN 880 - Leadership Consulta and Advoca**

This course explores leadership theories, management, administration, and the models and competencies for advocating on behalf of the profession and the client. Prerequisites; None. (SS)  
3.000 Credit hours

### **COUN 984 - Advanced Rehab Counsel Pract**

This course requires doctoral students to participate in a supervised doctoral-level

practicum of a minimum of 100 hours in counseling, which include hours for direct service with clients and group counseling. Prerequisites: COUN 800, COUN 802, and 989. (F;S;SS) Note: May be repeated for credit.  
3.000 Credit hours

### **COUN 985 - Counsel Edu and Supervi Intern**

Doctoral students are required to complete doctoral-level counseling internship with a minimum of 300 hours including supervised experiences in counselor education and supervision. The models and ehtical issues surrounding consultation are also emphasized. Prerequisites: COUN 870, COUN 880, COUN 984. (F;S;SS)  
3.000 Credit hours

### **COUN 986 - Counse Ed and Supv Internsh II**

Doctoral students are required to complete doctoral-level supervised experiences in counselor education and supervision. The models and ethical issues surrounding consultation are also emphasized. Prerequisites: COUN 815, COUN 818, COUN 984, COUN 989. (F;S;SS) Note: May be repeated for credit.  
3.000 Credit hours

### **COUN 989 - Semi in Ad Theo of Reha Coun**

In this professional seminar course, students explore and evaluate traditional and contemporary theories, group processes, and career exploration within the rehabilitation counseling profession. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **COUN 990 - Independent Study**

The doctoral independent study course offers students the opportunity to explore an area of interest. Prerequisites: None.

(F;S;SS)

3.000 Credit hours

### **COUN 997 - Dissertation**

This course offers doctoral students the opportunity to integrate their program of study into an in-depth exploration of a research study. Students complete the dissertation with the guidance of a chair and committee members. Students work with a dissertation chair to write the prospectus, complete an approved proposal, complete an application for Institutional Review Board approval, collect and analyze data, and complete the dissertation. During the final semester, students conclude with an oral defense of their dissertation. Prerequisites: COUN 991, COUN 984. (F;S;SS) Note: May be repeated for credit.

3.000 TO 12.000 Credit hours

### **COUN 999 - Continuation Residency**

Note: May be repeated for credit.

1.000 Credit hours

## **CSE Computational Science & Engineering**

### **CSE 620 - Intro to Compu Software Tools**

This course covers the introduction and application of commonly used computational tools including computer algebra systems, interpreted languages used as scripting languages, and programming. This course also covers the basics of computational science including finite precision arithmetic, logic, and algorithmic design. Prerequisite: None. (F;S)

3.000 Credit hours

### **CSE 701 - Appl Probability & Statistics**

This course addresses probability and statistics theory and techniques with common application in computational science and engineering. The course will include exploratory data analysis techniques,

statistical standard distributions, one-and-two sample tests with continuous data, regression analysis, analysis of variance, analysis of tabular data, sample size calculations, hypothesis testing, linear regression, and design of experiments. Statistical languages such as R will be used to implement the concepts learned in the course. Prerequisites: None. (F;S)

3.000 Credit hours

### **CSE 702 - Computa Meth for Algebraic Sys**

This course presents and discusses computational methods and their reliability, accuracy, and scalability, and computational implementations, with special emphasis on the solution, analysis, and optimization of linear and nonlinear algebraic systems. Topics include computational aspects of matrix theory, solution of large sparse linear systems, matrix decompositions such as the eigenvalue and singular value decomposition, linear and nonlinear programming, and function approximations. Prerequisites: None. (F;S)

3.000 Credit hours

### **CSE 703 - Program for Scalable Comp Sys**

This course presents the concepts, principles of hardware and software, communications and computational strategies for scalable, parallel computing systems, the associated computer data structures, programming libraries for parallel programming paradigms. This course is to bridge the gap between the parallel algorithms and applications which are often designed and described in abstract terms and the actual parallel computer architectures and their programming interfaces. Prerequisites: CSE 620. (F;S)

3.000 Credit hours

**CSE 720 - Research Computing Environment**

This course includes high performance computing environments, ranging from extreme high end desktop systems to scalable computing with clusters and MPP systems. Emphasis is on environments possessing the following elements: the Linux operating system, multi-core and GPGPU combined systems, large storage management, remote execution and schedulers for shared resource management. Prerequisites: Consent of Instructor. (F;S) 3.000 Credit hours

**CSE 785 - Special Topics**

This course is designed to allow the introduction of potential new courses on a trial basis or special content courses on a once only basis at the Master's level. The topic of the course and title are determined prior to registration. Prerequisites: Consent of Instructor, Graduate Standing. (F;S) Note: May be repeated for credit. 1.000 TO 4.000 Credit hours

**CSE 792 - Graduate Seminar**

Discussions and reports of subjects in Computational Science and Engineering and allied fields will be presented. Prerequisite: Mastes level standing. 1.000 Credit hours

**CSE 794 - Master's Supervised Research**

This is supervised research under the mentorship of a member of the graduate faculty. It is not intended to serve as the dissertation topic of the doctoral student. Prerequisite: Consent of Instructor. (F;S) 2.000 TO 3.000 Credit hours

**CSE 796 - Masters Project**

The student will conduct advanced research of interest to the student and the instructor. A written proposal, which outlines the nature of the project, must be submitted for

approval. This course is only available to project option students. Prerequisite: Masters level standing. 3.000 Credit hours

**CSE 797 - Master's Thesis**

Master of Science thesis research will be conducted under the supervision of the thesis committee chairperson leading to the completion of the Masters thesis. This course is available only to thesis option students and can be repeated. Prerequisite: Consent of advisor. Note: May be repeated for credit. 1.000 TO 6.000 Credit hours

**CSE 799 - Cont of Master's Thesis**

This course is a continuation of CSE 797. The course is for master's students who have completed all required credit hour requirements. Prerequisite: Completion of all Thesis/Dissertation Credits. Note: May be repeated for credit. 1.000 Credit hours

**CSE 801 - Computational Statistics**

This course covers computational statistical concepts for analyzing large data sets including. Topics include: maximum likelihood, generating random variables, estimating distributions via simulation, expectation maximization, data partitioning including bootstrapping, jackknifing and cross- validation, multivariate, parametric and non-parametric regression, principle components, classification and regression trees, and multivarite analysis of variance (MANOVA). Statistical packages such as MATLAB will be utilized to implement the concepts learned in the course. Prerequisites: None. (F;S) 0.000 OR 3.000 Credit hours

**CSE 803 - High-Performance and Scal Comp**

This course discusses computing paradigms, hardware and software implementations and communication and computational strategies for high-performance scalable and parallel computing systems; including clusters, grid computing, GPGPU computing and remote storage. Examples include MPI, OpenMP and GPU libraries for scalable computing and programming on available clusters. Prerequisites: CSE 703 or Consent of Instructor. (F;S)

3.000 Credit hours

### **CSE 804 - Computa Modeling and Visualiza**

This course covers some computational techniques for solving deterministic and non-deterministic models followed by analysis and interpretation techniques useful in the analysis of numerical data. The course includes the use of visualization tool kits, such as 3D visualization. Students will analyze the effectiveness of visual representations and construct their own visualizations, strengthening their abilities to explore, evaluate, and understand large amounts of quantitative data. Prerequisites: CSE 620 or Consent of Instructor. (F;S)

3.000 Credit hours

### **CSE 805 - Machine Learn and Data Mining**

This course covers machine-learning and data -mining concepts for analyzing very large, complex data sets Topics include data preprocessing, measuring data similarity, mining frequent patterns, association rule mining, classification/prediction, cluster analysis, neural-network, decision trees, discriminant analysis, rule-based decisions, nearest-neighbor and naive Bayes classifier, outlier detection and others. Machine learning tools like WEKA will be introduced to augment the course materials. Prerequisites: Consent of the instructor. (F;S)

3.000 Credit hours

### **CSE 826 - Modeling and Simula of Phys Sy**

This course will apply numerical methods to design and implement models for a variety of physical systems that are based on both continuum and particle paradigms. Both deterministic and stochastic approaches will be presented. Example applications include satellite trajectories, acoustics, electro-magnetic fields and or others.

Implementations using high-end scalable computing will be pursued. Prerequisites: Consent of Instructor. (F;S)

3.000 Credit hours

### **CSE 885 - Specials Topics**

This course is designed to allow the introduction of potential new courses on a trial basis or special content course as required at the doctoral level. Prerequisite: Consent of the Instructor. (F;S) Note: May be repeated for credit.

1.000 TO 4.000 Credit hours

### **CSE 991 - Doctoral Qualifying Exam**

This supervised program is for students who are taking the CSE Ph.D. program qualifying examination to demonstrate the understanding of the core areas of CSE and their domain research area. It culminates in a scheduled written examination administered on a Pass/Fail basis and must be passed after the completion of the first year of Ph.D. coursework or an unconditional basis. Prerequisites: Doctoral student in CSE with unconditional admission status and consent of academic advisor. (F;S)

3.000 Credit hours

### **CSE 992 - Doctoral Seminar**

Seminars delivered by student researchers, faculty, and invited speakers. The student receives a Pass/Fail and no letter grade is given upon completion. This course can be

taken more than once. Prerequisites: None. (F;S) Note: May be repeated for credit. 1.000 Credit hours

### **CSE 993 - Doctoral Supervised Teaching**

This course introduces the doctoral student to classroom or laboratory teaching under the supervision of a faculty mentor.

Prerequisites: Consent of Instructor. (F;S;SS)

2.000 TO 3.000 Credit hours

### **CSE 994 - Doctoral Supervised Research**

This is supervised research under the mentorship of a member of the graduate faculty. It is not intended to serve as the dissertation topic of the doctoral student.

Prerequisites: None. (F;S)

2.000 TO 3.000 Credit hours

### **CSE 995 - Doctoral Preliminary Exam**

This is required for students who have completed the CSE doctoral qualifying examination and who are taking the preliminary examination (oral preliminary defense). The student receives a Pass/Fail and no letter grade is given upon completion. Prerequisite: CSE 991. (F;S;SS) 3.000 Credit hours

### **CSE 997 - Doctoral Dissertation**

This represents the supervised research leading to the dissertation for the doctoral student. The student receives a Pass/Fail grade only after the completion of the final Ph.D. oral defense. Prerequisite: Doctoral standing. (F;S;SS) Note: May be repeated for credit.

1.000 TO 12.000 Credit hours

### **CSE 999 - Continuation of Dissertation**

This course is for doctoral students who have completed all required credit hour requirements. This can be repeated by the students as required. The student receives a Pass/Fail and no letter grade given upon

completion. Prerequisite: Completion of all dissertation credits. (F;S) Note: May be repeated for credit.

1.000 Credit hours

## **CST Computer Systems Technology**

### **CST 605 - Prin of Computer Networking**

This course focuses on the concepts and principles of computer network protocols. The topics include the fundamentals of computer networks and Internet, application layer, transport layer, network layer, link layer (links, access networks, and LANS), wireless and mobile networks, packet switching, addressing, routing and flow/congestion control, multimedia networking, security in computer networks, network management, and emphasis on internet working protocols. Prerequisites: None. (F;S;SS)

3.000 Credit hours

### **CST 610 - Digital Communications**

This course investigates the concepts of principles of digital communications systems for processing and transmitting different types of signals including audio, video and data. Topics include: sampling, quantization, multiplexing techniques, source coding, channel coding, modems, various compression schemes, signal impairments, and various digital modulation schemes. Prerequisites: None. (F;S;SS)

3.000 Credit hours

### **CST 615 - Advanced Net Security Applica**

This course explores security terms, definitions, concepts, and issues that face industries today. This course also will examine how the concept of security, and being secure, integrates into the overall enterprise mission. The importance of user involvement, security training, ethics, trust, and informed management will be explored.

Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **CST 620 - Telecommunications Management**

This course addresses fundamental principles of telecommunications management, which includes network management and administration, the telecommunications marketplace, and the planning and evaluation of systems. The Technology of modern telecommunications systems is also reviewed. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **CST 625 - Computer Database Management**

This course examines the fundamental concepts and theory of database management systems. Topics cover database system architectures, data models, query languages, conceptual database design, logical database design, normalization, and physical database design. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **CST 650 - Wireless Comm Systems I**

This course covers the concepts and principles of wireless communication systems. The topics include the fundamentals and designs of radio propagation, channel coding, radio access protocols, cellular concepts, channel allocations, multiple access techniques, modulation schemes, satellite systems, ad hoc and sensor networks, and routing protocols. Existing and next generation wireless communication systems are also analyzed. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **CST 655 - Optical Communication Systems**

This course covers free space and fiber optic technologies (including lasers, optical

amplifiers and optical filters) with applications to high-speed long distance systems, local area networks and communication systems. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **CST 685 - Special Topics**

This course involves the study of a topic not addressed by an existing course in the department. Typically, a topic is selected from within a new or evolving area in the field. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **690 - Ethical Issues in Informa Tech**

This course explores issues on the interface between information technology and society, with a special focus on ethical issues. Topics include ethical theory, privacy and security, spam, electronic commerce, the digital divide, open source software, medical informatics, bioinformatics, actor- network theory, ethnomethodology, and some neo-classical economics. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **CST 700 - Project Management**

This course covers project life cycle, planning templates, project deliverables, project work breakdown structure, estimating resources and task costs, Gantt charts, PERT techniques, project team duties and responsibilities, project team management techniques, and software tools for large projects. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **CST 702 - Statistical Methods**

This course introduces the concepts and methods of statistics and probability, which include descriptive statistics, probability theory, sampling distribution, probability

distributions, linear and multiple regressions, auto- and cross-correlation, and confidence intervals, t-test, and ANOVA. The nature of hypothesis testing and inference making for both parametric and non-parametric statistical processes is introduced. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **CST 703 - Tech Re Writing Communi Skills**

This course covers written and oral communications skills relevant to Information Technology (IT) management topics. It also covers ethical methods of IT research and analysis. Students are required to write a research paper on a discipline specific topic and present it either in the classroom or on line. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **CST 729 - Data Warehousing**

This course introduces the fundamental concept of planning, designing, building, populating and maintaining a data warehouse. Topics include data warehousing architecture, star schema and dimensional modeling, Extract-Load-Transform processes, and query design. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **CST 731 - Knowledge Discovery Systems**

This course focuses on the underlying principles and algorithms for analysis, design, implementation, and evaluation of knowledge Discovery Systems. Topics include data preprocessing, visualization, predictive modeling, association analysis, clustering, and anomaly detection. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **CST 750 - Computer System Security**

This course focuses on the concepts and principles of computer security, cryptography, authentication, securing networks, threat environment, access control, firewalls, host hardening, application security, data protection, incident response, and a networking primer. A clear theoretical understanding supports a large practical component. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **CST 755 - Enterprise Management Systems**

This course teaches the basic architectural concepts of IBM's System z (referred to as a mainframe) computing platform and the basis of decision to use a mainframe. The course also provides advantages/disadvantages of the zSeries including total cost of ownership, scalability, performance, administration, availability, system, memory management, security and connectivity advantages (virtual networking). The students learn such concepts of a Geographically Dispersed Parallel Sysplex system, virtualization, reliability, accessibility and scalability. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **CST 790 - Independent Study**

The purpose of this course is to allow graduate students to pursue a specialized area of study if that area is not covered by the regular courses. S/U (Satisfactory/Unsatisfactory grade only. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **CST 797 - Master's Thesis**

The student will select a research topic that is of special interest and approved by his/her graduate thesis advisor. Prerequisites: Advisor Approval. (F;S;SS) Note: May be repeated for credit.

1.000 TO 6.000 Credit hours

**CST 799 - Continuation/Residency**

Meets requirement for continuous enrollment during final term prior to graduation when all course credit requirements (including thesis or dissertation) have been completed. This course is non-graded, may receive a grade of S/U, and credit for this course does not count toward the degree. May be taken twice. S/U (Satisfactory/ Unsatisfactory grade only) Prerequisites: Advisor Approval. (F;S;SS) Note: May be repeated for credit.

1.000 TO 3.000 Credit hours

**CUIN Education Preparation**

**CUIN 612 - Social Studies Elem Schools**

3.000 Credit hours

**CUIN 613 - Science in Elementary School**

3.000 Credit hours

**CUIN 618 - Learn Theo World Par Prac 21st**

This course examines learning theories in the context of the 21st century classroom and addresses the significant shifts that have occurred in the conceptualization of constructs of learning and instruction.

Prerequisite: None. (F;SS)

3.000 Credit hours

**CUIN 620 - Foundations in Reading**

Basic reading course which considers the broad field of reading - its goal and nature; factors affecting its growth; sequential development of skills, attitudes and interests; types of reading approaches; organization and materials in teaching fundamentals of reading. (F;S;SS)

3.000 Credit hours

**CUIN 627 - Literacy in the Content Areas**

This course is designed to prepare secondary school teachers to plan and deliver literacy-focused instruction in all content areas.

Students will examine current research and instructional models for improving 21st century literacy skills. Prerequisite: None.

3.000 Credit hours

**CUIN 640 - Meth of Teach 21st Cen Class**

This course provides the opportunity for teacher candidates to design, deliver and assess effective instruction. Emphasis will be placed on the use of multiple methodologies to inform instruction to meet the needs of culturally and linguistically diverse populations. A 60-hour field experience in an approved PK-12 school is required. Prerequisites: CUIN 410 and Cuin 520 and admission to Teacher Education. (F;S)

3.000 Credit hours

**CUIN 660 - Clinical Prac in Teacher Educa**

This course is the culminating clinical experience for teacher candidates. Teacher candidates must complete a full-time supervised teaching experience in an approved PK-12 classroom. This course must be taken in conjunction with the capstone experience. Prerequisites: CUIN 640 or equivalent and admission to Teacher Education. Corequisite: CUIN 670. (F;S)

6.000 TO 9.000 Credit hours

**CUIN 670 - Capstone Experi in Teach Educa**

Teacher candidates will analyze topics related to professional practice, in the context of their culminating clinical experience. They will refine evidences of professional knowledge, skills, and the dispositions through presentation in a capstone portfolio. Prerequisites: CUIN 640 and admission to Teacher Education.

Corequisite: CUIN 660. (F;S)



3.000 Credit hours

**CUIN 681 - Issues In Education**

A critical review of the background and functions of the school as a social institution. (F,S,S)

3.000 Credit hours

**CUIN 711 - Meth & Technol of Research**

This course is designed to teach students to be able to locate, read, understand, critique, and use the results of research to become more effective professional and make sound educational decisions. Students will develop an understanding of the researcher's methodologies, the procedures, and results. Students will analyze and evaluate research, judge the usefulness of the findings for educational practice, and plan research to improve educational practice. (F;S;SS)

3.000 Credit hours

**CUIN 715 - Assess and Eval 21st Cen Learn**

This course is designed to equip the learner with the knowledge, skills and dispositions to create balanced assessments in the 21st century classroom. This course will focus on differentiating assessments including: traditional, authentic, portfolios, and performance assessments. Prerequisite: None. (F;SS)

3.000 Credit hours

**CUIN 721 - Advance Methods of Instruction**

This course will focus on using and understanding of child development, diversity issues and motivational strategies to plan interdisciplinary units of instruction and assessment and implement these plans. Internship is required. Prerequisites: Admission to the School of Graduate Studies. (F,S,S)

3.000 Credit hours

**CUIN 729 - Diversity Issues K-12 Schools**

This course is designed to examine issues of diversity including economic, gender, ethnic, cultural, political, physical and cognitive diversities, and how they impact classroom practices. (F;S;S)

3.000 Credit hours

**CUIN 785 - Clin Teaching in P-12 Schools**

3.000 Credit hours

**ECEN Electrical & Computer Engineering**

**ECEN 608 - Analog Electronics**

This course covers the analysis, design and application of analog integrated circuits. These circuits may include operational amplifiers, voltage comparators, voltage regulators, Monolithio power amplifiers, Digital to Analog (D/A) and Analog to Digital (A/D) converters, voltage-controlled oscillators, phase-locked loops, other special-function integrated circuits.

Prerequisites: ECEN 460 or consent of instructor. (F;S;SS)

3.000 Credit hours

**ECEN 621 - Embedded Computing Sys Design**

This course is a study of Embedded Computing System (a.k.a Embedded System) Design, which is the design of microprocessor-based, application specific systems. A popular contemporary high-level language is used for the majority of the software development, with some use of assembly language as well. An integrated development environment (IDE) popular in industry, along with a compatible hardware evaluation board, are utilized for practical experience. The core of the course material is organized using a data access hierarchy perspective. Other embedded computing topics covered include hardware/software co-design and debugging, real-time systems,

digital/analog interfacing, low power modes, and firmware. Prerequisites: None. (F)  
3.000 Credit hours

### **ECEN 623 - Advanced Digital Systems**

Digital system top-down design and analysis will be presented. Topics include timing, power and performance issues in digital circuits, Very High Speed Integrated Circuit Hardware Description Language (VHDL)-based system analysis and synthesis, hardware-software co-design, data-flow models, and digital system primitives. This course includes experience with Field Programmable Gate Array (FPGA) based project implementations. Prerequisites: None. (F)  
3.000 Credit hours

### **ECEN 625 - Microwave Circuits**

This course will cover RF and microwave circuits appropriate for wireless communications and radar sensing. It emphasizes the theoretical and practical aspects of microstrip design of highly integrated systems. Matrix analysis and computer-aided design techniques are introduced and used for the analysis and design of circuits. Impedance transformer, power combiner, couplers, mixers, and calibrated measurements techniques are also covered. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **ECEN 626 - Electronic Design Automation**

This class introduces Electronic Design Automation (EDA) and explores performance-driven approaches to the following concepts: technology mapping, circuit partitioning, chip floor planning, cell placement, and wire routing. Also discussed are applications of a number of important optimization techniques, such as network flow, Steiner tree, scheduling, simulated annealing, and linear programming.

Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **ECEN 629 - Very Large Scale Integrat Cir**

This course introduces CMOS technology and devices for design and implementation of digital integrated circuits. Propagation delay and power dissipation of static and dynamic combinational and sequential logic circuits are studied. Method of Logical Effort is introduced for predicting path delays. Layout design rules and verification tools are introduced. Design examples include Arithmetic Units and Memory and Array Structures. Prerequisites: None. (S)  
3.000 Credit hours

### **ECEN 647 - Introduction to Telecommunica**

This course introduces telecommunication networks utilization and design. Emphasis is on using and designing voice, video and image digital networks. Prerequisites: ECEN 400 or consent of instructor. (F;S;SS)  
3.000 Credit hours

### **ECEN 649 - Digital Communications**

The fundamental theory and applications of the digital communications are introduced. Topics in digital communications include sampling, quantizing, coding detection, modulation/demodulation, signal-to-noise ratio, and error probability. Prerequisites: None. (F)  
3.000 Credit hours

### **ECEN 650 - Digital Signal Processing**

This course introduces a fundamental theory and applications for digital signal processing including topics such as digital signals and systems, digital filtering, spectral analysis, and Discrete Fourier transform (DFT). (F)  
3.000 Credit hours

**ECEN 656 - Probability and Random Process**

This course covers sample space and events, conditional probabilities, independent events, Bayes formula, discrete random variables, expectation of random variables, joint distribution, conditional expectation, Markov chains, stationary processes, ergodicity, correlation and power spectrum of stationary processes, and Gaussian processes. Prerequisites: ECEN 400 or consent of instructor. (F;S;SS)  
3.000 Credit hours

**ECEN 657 - Digital Image Processing**

This course deals with concepts and techniques for digital image analysis and processing. Topics include image representation, image enhancement, edge extraction, image segmentation, geometric structure, feature extraction, knowledge representation, and image understanding. Prerequisites: ECEN 400 or consent of instructor. (F;S;SS)  
3.000 Credit hours

**ECEN 661 - Power Systems Analysis**

The course studies power system representation, transmission lines, symmetrical and asymmetrical faults, electrical power flow, power systems control and stability. Prerequisites: ECEN 430. (F;S;SS)  
3.000 Credit hours

**ECEN 668 - Theory of Linear Control Sys**

The aim of a control system is to influence the system's behavior to achieve a desired performance. Many control systems can be described by a linear model for which there are well developed analysis and synthesis tools. The focus of this course will be on linear time invariant lumped systems which are described either by state space equations or rational transfer functions. Different analysis and design techniques will be

discussed. Prerequisites: None. (F)  
3.000 Credit hours

**ECEN 674 - Genetic Algorithms**

This course covers the theory and application of genetic algorithms. Genetic algorithms combine a Darwinian survival of -the-fittest with a randomized, yet structured, information exchange to form an improved search mechanism with surprising robustness. Engineering applications of genetic algorithms for design and control will be presented. Prerequisites: ECEN 410 or consent of the instructor. (F;S;SS)  
3.000 Credit hours

**ECEN 678 - Intro to Artifi Neural network**

This course introduces neural network design and development. Emphasis is on designing and implementing information processing systems that autonomously develop operational capabilities in adaptive response to an information environment. Prerequisites: ECEN 400 or consent of instructor. (F;S;SS)  
3.000 Credit hours

**ECEN 685 - Selected Topics in Engineering**

This lecture course is used to introduce engineering topics of current interest to students and faculty. The subject matter will be identified before the beginning of the course. Prerequisites: Consent of instructor. (F;S;SS)  
3.000 Credit hours

**ECEN 686 - Special Projects**

This is an investigation of an engineering topic, which is arranged between a student and a faculty advisor. Project topics may be analytical and/or experimental and should encourage independent study. Prerequisites: Consent of instructor. (F;S;SS)  
1.000 TO 3.000 Credit hours

**ECEN 701 - Electronic Ceramics**

This course introduces the properties of ceramic materials in electronic applications. The effects of processing parameters on the ultimate device characteristics will be investigated. Prerequisites: ECEN 602 or consent of instructor. (F;S;SS)  
3.000 Credit hours

**ECEN 702 - Semiconductor Theory Devices**

This course is a study of the phenomena of solid-state conduction and devices using band models, excess carriers in semiconductors, p-n junctions, and devices. Prerequisites: None. (F) Note: May be repeated for credit.  
3.000 Credit hours

**ECEN 723 - System Design Using Programmable Logic Devices**

This course will cover advanced system design using modern programmable logic devices. Hardware/software co-design techniques will be discussed. Includes comparisons of commercially available Programmable Logic Devices and consider their applications in both combinational and sequential logic system design. Students will also be familiarized with hardware description language such as VHDL and show how design ideas can be efficiently translated into programmable hardware implementations. Prerequisites: ECEN 623. (S)  
3.000 Credit hours

**ECEN 724 - Mixed Signal VLSI Design**

This course will introduce CMOS circuit techniques for low- power, low-voltage mixed-signal integrated circuits. Continuous-time signal processing, sampled-data analog filters, delta-sigma data converters, and mixed analog- digital layout techniques will be introduced. Prerequisites:

None. (S)  
3.000 Credit hours

**ECEN 725 - Pervasive Computing System Design**

This course is a study of Pervasive Computing (a.k.a. Ubiquitous Computing) System Design, which is the seamless integration of computing and communication technology into human-centered environments. A popular object-oriented internet programming language, its corresponding integrated development environment (IDE), and contemporary smart devices are used for prototyping most of the example systems. The core of the course material is organized using a contextual data access hierarchy perspective. Other pervasive computing topics covered include wearable computing, smart devices, intelligent environments, and the Internet of Things. Prerequisites: ECEN 621. (S)  
3.000 Credit hours

**ECEN 792 - Master Seminar**

Discussions and reports of subjects in electrical engineering and allied fields will be presented. Prerequisite: Master level standing. (F;S;SS)  
1.000 Credit hours

**ECEN 796 - Master Project**

The student will conduct advanced research of interest to the student and the instructor. A written proposal, which outlines the nature of the project, must be submitted for approval. This course is only available to project option students. Prerequisite: Masters standing and Consent of advisor. (F;S;SS)  
3.000 Credit hours

**ECEN 797 - Masters Thesis**

Master of Science thesis research will be conducted under the supervision of the thesis committee chairperson leading to the

completion of the Master's thesis. This course is only available to thesis option students. (F;S;SS) Note: May be repeated for credit.

3.000 TO 6.000 Credit hours

### **ECEN 799 - Master Thesis Continuation**

The course is for Master's students who have completed all required course works and all Master Project or Thesis credits. This optional course assists the student in maintaining full-time enrollment following completion of the Master Project, ECEN 796 or Master Thesis, ECEN 797. The course may be taken to allow time for the student to complete the final project or thesis write-up and to prepare for the masters project or thesis defense.

Prerequisites: Completion of all required course works and master project or thesis credits for Master standing students and Consent of advisor. (F;S;SS)

1.000 Credit hours

### **ECEN 801 - Solid State Devices**

This course deals with p-n junction and Schottky barrier diodes, bipolar junction and field effect transistors, heterostructure devices (e.g. heterojunction bipolar transistors and solar cells), and device modeling and simulation. Prerequisite: ECEN 602 or consent of instructor. (F;S;SS)

3.000 Credit hours

### **ECEN 805 - Thin Film Tech for Device Fab**

The course will provide the principles and practices of different film deposition techniques, high vacuum technology, nucleation and growth of thin films as well as epitaxial growth of films. Prerequisites: None. (S)

3.000 Credit hours

### **ECEN 812 - RF CMOS Integrated Circuits**

This course covers the design of RF CMOS integrated circuits. Passive and active RF components and their modeling using modern CAD tools, high-frequency circuit design techniques, noise analysis and RF circuits such as low-noise amplifiers (LNA), mixers, voltage-controlled oscillators (VCO), power amplifiers, and wireless transceiver architectures will be presented.

Prerequisites: None. (S)

3.000 Credit hours

### **ECEN 857 - Pattern Recognition**

This course covers classical topics in statistical decision function, Bayesian learning, error probability estimation, cluster-seeking, and deterministic approach. Several related topics are discussed, including stochastic approximation, feature selection and ranking, syntactic and structural pattern recognition. Prerequisites: ECEN 657 or consent of instructor. (F;S;SS)

3.000 Credit hours

### **ECEN 865 - Optical Control Systems**

In many practical control problems it is required to find a control technique to optimally improve the dynamical system's performance while satisfying different physical constraints. The system performance can be quantified as a performance index or a cost function. Then, the problem will be reduced to find a control law to optimize a given cost functions. This course explores theory and application of optimal control for linear and nonlinear systems. The course uses optimal control theory and computational optimal control algorithms to improve the system's performance, reduce the control energy, and stabilize the system. Prerequisites: ECEN 668 or consent of instructor. (S)

3.000 Credit hours

### **ECEN 870 - Fuzzy Logic with Applications**

The course objective is to understand the basic theory and the foundations of fuzzy sets. Fuzzy logic is shown to contain evidence, possibility, and probability logic. This course emphasizes engineering applications in control, decision-making, and pattern recognition. The hardware/software implementation of those applications is also demonstrated. Prerequisites: ECEN 668 or consent of instructor. (F;S;SS)  
3.000 Credit hours

### **ECEN 885 - Doctoral Special Topics**

This lecture course is used to introduce engineering topics of current interest to doctoral students and faculty. The subject matter will be identified before the beginning of the course. Prerequisites: Doctoral student and consent of instructor. (F;S;SS)  
3.000 Credit hours

### **ECEN 991 - Doctoral Qualifying Exam**

This course is for students who are preparing for and taking the written qualifying examination. Prerequisite: Doctoral student and consent of instructor. (F;S;SS)  
1.000 Credit hours

### **ECEN 992 - Doctoral Seminar**

In this course, doctoral students attend colloquia or seminars. These consist of presentations by doctoral students on dissertation topics and works-in-progress and by guests on important classical, contemporary, or research problems in electrical engineering. Prerequisite: Doctoral level standing. (F;S;SS) Note: May be repeated for credit.  
1.000 Credit hours

### **ECEN 994 - Doctoral Supervised Research**

This is supervised research under the mentorship of a member of the graduate faculty. It is not intended to serve as the dissertation topic of the doctoral student. Prerequisites: Doctoral student and consent of instructor. (F;S;SS)  
3.000 Credit hours

### **ECEN 995 - Doctoral Preliminary Examina**

This course is for students who are preparing for and taking the written and/or oral preliminary examination. Prerequisites: Doctoral student and consent of instructor. (F;S;SS)  
3.000 Credit hours

### **ECEN 997 - Doctorial Dissertation**

This supervised research serves as the dissertation of the doctoral student. Twelve credits of dissertation are required for graduation. Prerequisites: Doctoral student and consent of instructor. (F;S;SS) Note: May be repeated for credit.  
3.000 TO 12.000 Credit hours

### **ECEN 999 - Doctoral Dissertation Continua**

The course is for doctoral students who have completed all required course works and all dissertation credits. This optional course assists the student in maintaining full-time enrollment following completion of the Doctoral Dissertation, ECEN 997. The course may be taken to allow time for the student to complete the dissertation write-up and to prepare for the dissertation defense. Prerequisites: Completion of all required course works and dissertation credits for Doctoral student and Consent of advisor. (F;S;SS) Note: May be repeated for credit.  
1.000 Credit hours

## **ECON Economics**

### **ECON 601 - Economic Understanding**

An introduction to the principles of economics utilizing the macro approach. No credit towards a degree in economics.  
3.000 Credit hours

### **ECON 606 - Foundns Econ Grad Students**

This course introduces basic economic principles and their applications in business. Basic economic concepts, including marginal analysis of consumer and firm decisions, are covered, along with macroeconomic theories that support managers' understanding of the global economic environment and the economic policies affecting that environment.  
Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **ECON 708 - Managerial Economics**

This course will apply the tools and methods of microeconomics theory to specific management decision making in the private sector. Particular emphasis will be placed on pricing profit, maximization, capital budgeting and financial decisions in the long-run. Prerequisites: ACCT 708, MGMT 705, MGMT 712, ECON 706 and MGMT 715 (S)  
3.000 Credit hours

## **EDPR Education Preparation**

### **EDPR 600 - The Learner and Learning Envi**

3.000 Credit hours

### **EDPR 601 - Teaching for Diverse Learners**

3.000 Credit hours

### **EDPR 611 - Instructional Planning**

3.000 Credit hours

### **EDPR 612 - Planning and Assessing Literac**

3.000 Credit hours

### **EDPR 615 - Assessment of Learning**

3.000 Credit hours

### **EHS 711 - Curr Iss in Occ Sfty and Hlth**

3.000 Credit hours

## **ELED Educator Preparation**

### **ELED 611 - Balanced Lit for Ele Learns I**

This course provides a framework for understanding the development of language and literacy in children. It is designed to help students learn to build on what children bring to oral language, reading and writing, and to enhance developmentally appropriate language and literacy activities.

Prerequisites: SPED 661, INST 605.

(F;S;SS)

3.000 Credit hours

### **ELED 612 - Mathe Curricu and Pedagogy I**

This course is designed to develop the knowledge and skills to effectively teach math concepts to the young child through grade six. Methods will be presented in a developmental sequence that supports children's construction of the concepts essential to understanding mathematics.

Specifically, this course will provide elementary education candidates with an activity and project-based exploration of informal geometry in two and three dimensions. Prerequisites: INST 605, SPED 661 and ELED 610. (F;S;SS)

3.000 Credit hours

### **ELED 616 - Social Stud Sci Curric and Ped**

This course explores the scope and sequence of the elementary curriculum areas of science, social studies and health.

Prerequisite: ELED 610. (F;S;SS)  
3.000 Credit hours

**ELED 618 - Clin Prac 21st Cen ELE Class**

A field experience which emphasizes the development and use of teaching strategies, methods, skills, and assessments as they relate to the principles of teaching and learning, and the decision making process. The student will use a variety of teaching strategies, methods, skills, and instructional resources. Prerequisites: All Phase I Course work. (F;S;SS)  
6.000 Credit hours

**ELED 619 - Action Re for Elemen Ed Class**

This course will provide candidates an opportunity to examine the role of teachers as researchers, utilizing an embedded field experience that emphasizes research and its influence on teaching practices. Prerequisite: Successful completion of Phase I requirements. (F;S;SS)  
3.000 Credit hours

**ELED 740 - Di Learn Dif 21st Cen El Class**

This course focuses on ethnically, linguistically, and culturally diverse learners in the elementary classroom, systemic issues that impact their learning, and culturally responsive practices needed to teach these learners. Prerequisite: Completion of Phase I of the MAED Degree Program in Elementary Education. (F;S;SS)  
3.000 Credit hours

**ELED 789 - The Capstone Experience**  
0.000 Credit hours

**ENGL English**

**ENGL 600 - Lang Variation in Amer English**

This course is a survey of regional and social dialects in the United States and a study of their interrelationship; examples of some of the motivations for dialectical divergences, especially in the instance of non-standard dialects; and a consideration of functional varieties and social dialect shifting. Prerequisite: English 310 or graduate standing.  
3.000 Credit hours

**ENGL 602 - Ad Meth Teach Eng in Sec School**

This course prepares students to become effective teachers of secondary English/Language Arts. Students will explore the materials and methods of teaching English, especially as related to the successful implementation of instruction based on the Common Core State Standards for English/Language Arts. Prerequisite: CUIN 520. (F;S)  
3.000 Credit hours

**ENGL 603 - Introduction to Folklore**

This course is a basic introduction to the study and appreciation of folklore. (Cross-listed as Anthropology 603 (summer/alternate years)  
3.000 Credit hours

**ENGL 627 - High School Literature**

This course acquaints prospective and in-service teachers with a wide variety of literature taught in the high schools of North Carolina. Students will survey texts in a variety of genres, select texts appropriate for high school programs, examine themes found in the literature, and investigate strategies for encouraging student reading. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

**ENGL 653 - Teaching Eng as a Sec Language**



This course introduces prospective secondary and college teachers of students learning English as a second and/or a foreign language to various pedagogical approaches. The course will explore theories and practices aimed at second language acquisition involving reading and writing. (F;S;SS)  
3.000 Credit hours

**ENGL 654 - African American Novel I**

This course is an intensive bibliographical, critical, and interpretative study of novels by major African American writers through 1040, Novelists emphasized include Dunbar, Chestnutt, Toomer, McKay, Larsen, Hurston, Griggs, Fauset, and Wright.  
3.000 Credit hours

**ENGL 656 - African American Novel II**

This course is an intensive bibliographical, critical, and interpretative study of novels by major Africa American writers after 1040. Novelists emphasized include Wright, Ellison, Baldwin, Himes, Demby, Williams, Walker, Brooks, Petry, Gaines, and Mayfield.  
3.000 Credit hours

**ENGL 658 - African American Poetry I**

This course is an intensive study of African American poetry from its beginning to 1940, with special attention given to poets of the Harlem Renaissance. Poets to be studied include Terry, Hammon, Wheatley, A. A. Whitman, Horton, Braithwaite, J.W. Johnson, Horne, Fenton Johnson, George Douglas Johnson, McKay, Cullen, Cuney, and Hughes.  
3.000 Credit hours

**ENGL 660 - African American Poetry II**

This course is an intensive stury of African American poetry from 1940 to the present with considerable attention given to the revolutionary poets of the sixties and

seventies. Poets to be studied include Hughes, Walker, F.M. Davis, Brooks, Brown, Hayden, Tolson, Lee, Reed, Giovanni, Angelou, Jeffers, Sanchez, Redmand, Fabio, Fields, and Baraka.  
3.000 Credit hours

**ENGL 672 - Directed Study in English**

3.000 Credit hours

**ENGL 700 - Introduction to Critical Theor**

This course outlines and critiques major movements in contemporary literary theory, including, for example, Marxism, feminism, and various poststructuralisms.  
Prerequisites: Graduate. (S)  
3.000 Credit hours

**ENGL 712 - Teaching of Freshman Writing**

This course is required of all English graduate teaching assistants (GTAs), and is designed solely to provide an academic setting for the theoretical and practical components of teaching English 100. GTAs will discuss and implement writing assignments, exercises in literature and grammar, and the methods of leading class discussion.  
3.000 Credit hours

**ENGL 721 - Major American Writers I**

This course is an intensive bibliographical, critical, and interpretive study of works by major American writers through 1900. Writers to be discussed will vary, and will include Emerson, Fuller, Thoreau, Melville, Dickinson, and James, among several others.  
3.000 Credit hours

**ENGL 722 - Major American Writers II**

This course is an intensive bibliographical, critial, and interpretive study of works by major American writers from 1900 to the present. Writers to be discussed will vary,

and will include Stein, Eliot, Hemingway, Faulkner, Toomer, Hurston, Frost, Oates, and Morrison, among several others.

3.000 Credit hours

**ENGL 724 - American Multi-Cultural Lit**

This course will examine the critical and historical perspectives of selected works by Native American, Asian American, and Hispanic (including American Chicano, Latino, and Puerto Rican) authors. Writers to be studied include Black Elk, Paula Gunn Allen, Joy Harjo, Louise Erdrich, N. Scott Momaday, Simon Ortiz, Leslie Marmon Silko, James Welch, Maxine Hong Kingston, Frank Chin, Amy Tan, Jose Garcia Villa, Rudolfo Anaya, Pat Victor Cruz Hernandez, and Sandra Cisneros.

3.000 Credit hours

**ENGL 744 - Postcolonial Novel and Theory**

This course examines postcolonial theory and its application to both postcolonial (including the Caribbean, Latin America, Africa, the Middle East, and the Balkans, the former republics of the Soviet Union, India, Asia, and Oceania) novels and contemporary society, whether local, national, or global. Prerequisites NONE. (F;S;SS)

3.000 Credit hours

**ENGL 753 - Bibliography & Research**

This course is an introduction to tools and techniques used in investigation of literary subjects and helps students to design individual research projects. Prerequisites: Graduate. (F)

3.000 Credit hours

**ENGL 755 - Cont Prac Grammar & Rhetoric**

This course is designed to provide secondary teachers of English with experience in linguistics applied to modern grammar and composition.

3.000 Credit hours

**ENGL 762 - Short Fiction Afri-Amer Writer**

This course is an intensive examination of short fiction by African American writers. Among those included are Chesnutt, Dunbar, Toomer, Hurston, McKay, Hughes, Bontemps, Wright, Clarke, Ellison, Fair, Alice Walker, Ron Milner, Julia Fields, Jean W. Smith, Petry, Baldwin, Kelley, and Baraka.

3.000 Credit hours

**ENGL 764 - African-American Aesthetics**

This course defines those qualities of African American literature that distinguish it from traditional American literature through an analysis of theme, form and technique as they appear in a representative sample of works by African-American writers.

3.000 Credit hours

**ENGL 789 - Semi in African Amer Lit Lan**

This is a topics course that will vary; focus will be on prominent themes and/or subjects treated by African American writers from the beginning to the present. An attempt will be made to characterize systematically the idiom (modes of expression, style) of African American writers. Prerequisites: Graduate. Demand.

3.000 Credit hours

**ENGL 790 - Independent Study**

This course provides an opportunity for students to pursue in-depth study in literary criticism, literature, linguistics, or writing. Also, work done in this course may serve as groundwork for students pursuing the thesis option, developing a portfolio, or acquiring practicum experience. Repeatable once upon approval of departmental chair and/or coordinator of graduate studies in English.

Prerequisite: approval of and prior consultation with instructor. (F;S;SS)  
3.000 Credit hours

### **ENGL 797 - Thesis Research**

Note: May be repeated for credit.  
6.000 Credit hours

### **ENGL 799 - Continuation of Thesis**

Note: May be repeated for credit.  
1.000 Credit hours

## **ENVS Natural Resource & Environmental Design**

### **ENVS 622 - Sanitation and Waste Manage**

This course is the study of traditional and innovative methods of managing and handling liquid, solid and other forms of waste products in urban and rural environments. Prerequisites: Senior standing and consent of instructor. (F)  
0.000 OR 3.000 Credit hours

### **ENVS 699 - Environmental Problems**

This course covers multidisciplinary examinations of environmental problems and application of innovative techniques of analysis to environmental problems. Team taught by environmental faculty. Prerequisites: Senior standing and consent of the instructor. (F)  
3.000 Credit hours

## **FCS Family and Consumer Sciences**

**FCS 603 - Sp Prob In Fam And Cons Sci**  
Problems in the various areas of Family & Consumer Sciences may be chosen for individual study.  
3.000 Credit hours

### **FCS 629 - Appl Princ Infant & Toddler Cur**

This course is designed to link child development theories, assessment, and classroom practices for infant, toddlers, and young children, birth to age three, and their families. A major emphasis of this course is to prepare students to plan, implement, and evaluate developmentally, individually, and culturally appropriate child care practices, teaching strategies and learning environments for infants, toddlers, and young children with and without disabilities. Students will apply content knowledge, skills, and dispositions in the field-based experience. Prerequisites: FCS 600. (F;S)  
3.000 Credit hours

### **FCS 633 - Food Analysis**

This course is the study of fundamental chemicals, physical and sensory aspects of food composition as they relate to physical properties, acceptability and nutritional values of foods. Prerequisites: CHEM 102, 112, and FCS 236.  
3.000 Credit hours

### **FCS 637 - Spe Prob Food Nutrit-Food Sci**

This course provides independent study/research in the areas of Food and Nutrition or Food Science. Prerequisites: Junior, senior, graduate standing, and consent of instructor.  
3.000 Credit hours

### **FCS 639 - Appl Prin Preschl Kinderg Curr**

This course involves the study of basic principles, materials, and evaluation measures underlying acting leading experiences in improving children's intellectual styles and social relations. Special attention is given to goals and objectives, daily routine, teacher-made materials, questioning techniques and ideas for small and large group activities.

Simulated teaching experiences are required.  
Prerequisites: FCS 310, 311, 414, and 600.  
3.000 Credit hours

### **FCS 640 - Geriatric Nutrition**

Multi-disciplinary approaches to geriatric foods, nutrition and health problems. Evaluation of nutritional status and nutrition care of the elderly is emphasized. Field experiences: nursing home and other community agencies. Prerequisites: FCS 337.  
3.000 Credit hours

### **FCS 641 - Food Protection and Defense**

This course covers foundational and advanced concepts and policies related to protecting the food supply from intentional contamination. Prerequisite: Permission of Instructor. (F;S;SS)  
4.000 Credit hours

### **FCS 643 - Food Preservation**

This course is a study of current methods of preserving foods - canning, freezing, dehydration, radiation and fermentation. Prerequisite: FCS 236 or equivalent.  
3.000 Credit hours

### **FCS 679 - Nutrition Education**

This course covers the philosophy, principles, methods and materials involved in nutrition education. The application of nutrition knowledge and skills in the development of the nutrition education curriculum and programs in schools and communities are implemented. Prerequisites. (FCS) 332 and 337. Students must be advanced undergraduate or graduate level.  
3.000 Credit hours

### **FCS 681 - Curr Instruct Plan Assessment**

This course addresses the need for planning programs in education. The course covers teaching objectives, curriculum models,

evaluation of family and consumer sciences programs, use of advisory groups, organizations, and use of resources and facilities. Prerequisites: Consent of Instructor. (F;S)  
3.000 Credit hours

### **FCS 682 - Advanced Interior Design**

This course will address the current aspects of interior design. Topics to be covered include certification laws, fire-safety and abrasions resistance requirements for furniture and fabrics, accommodations for universal access, and issues of environmentalism. Stylistically, the course will address neoornamentalism, post modernism, and deconstructionism. Additionally. students will be made aware of new composite materials, acoustic controls, and lighting types. Prerequisites: Consent of Instructor, (F;S)  
3.000 Credit hours

### **FCS 683 - Consumer Behavior in Fashion**

This course is the study of how the consumer's world is influenced by the actions of fashion marketers and how fashion marketers are influenced by consumers. Marketing and consumer behavior theories and concepts as they apply to fashion will be discussed. Results of research studies will be used to illustrate marketing and consumer behavior theories and concepts. Students will gain an understanding of how fashion shapes the everyday world of consumers. Prerequisites: Permission of Instructor. (F;S)  
3.000 Credit hours

### **FCS 700 - Adv Multicul Apprch Chld Dev**

This course analyzes how national and international cultural experiences impact the purposes and practices of educational programs and policies. The research base for teaching and learning methods that are responsive to diverse learners will be

examined. Students will develop systemic educational models that address child and family diversity. Prerequisites: Completion of Phase I or Permission of Instructor. (F;S) 3.000 Credit hours

### **FCS 701 - Family in Contemporary Society**

This course will focus on the advanced theoretical approaches to understanding the roles and responsibilities of family functioning, priorities and concerns within the context of a diverse society. This course will also address the professional's role in promoting optimal family functioning. Prerequisites: FCS 611, SPED 600 or Permission of Instructor. (F;S) 3.000 Credit hours

### **FCS 702 - Ad In Meth in Fam and Con Sci**

This course provides differentiating instructional strategies and techniques that respond to the diverse learning styles and needs of learners. The theoretical foundation and practical application of one or more teaching strategies will be explored and critically assessed within the context of sound curriculum design, principles and processes at the preschool and secondary levels. Prerequisite: Permission of instructor. (F;S;SS) 3.000 Credit hours

### **FCS 704 - Cur Issues in Fam and Con Sci**

This course will examine current and relevant issues, trends and initiatives at the local, state, national, and international levels as they relate to family and consumer sciences. Prerequisites: Completion of Phase 1 or Consent of Instructor. (F;S;SS) 2.000 Credit hours

### **FCS 711 - Re Design Meth in Fam Con Sci**

This is an introductory course in research methodology to include formulation of a research problem, design, sampling, data collection, measurement, data analysis, interpretation, and writing the research report. Students will examine current research in Child, Family, Food & Nutrition and Consumer Sciences. Prerequisites: Graduate Standing. (F;S;SS) 3.000 Credit hours

### **FCS 713 - Early Chld Leader and Prof Dev**

This course examines a variety of leadership models, roles, and personal styles. Topics will include problem analyses, collaboration, conflict resolution, group facilitation, effective communication, and reflective practice. Strategies for valuing, supporting and sustaining life-long learning through personal and professional growth will be explored. Prerequisites: Completion of Phase 1. (F;S) 3.000 Credit hours

### **FCS 715 - Trace Elements and Nutrition**

Physiological functions and requirements of trace minerals as well as the roles of trace minerals in health and disease will be discussed. Prerequisites: FCS 357, CHEM 651. (F;S;SS) 3.000 Credit hours

### **730 - Nutrition and Disease**

Significance of nutrition in health and disease. Consideration of: (1) the methods of appraisal of human nutritional status to include clinical, dietary, biochemical, and anthropometric techniques; (2) various biochemical parameters used to diagnose and treat disorders; and (3) the role of diet as a therapeutic tool. Prerequisite: FCS 630 or equivalent. 3.000 Credit hours

### **FCS 735 - Experimental Foods**

Objective and subjective evaluation of food, development and testing of recipes, and experimentation with food. Prerequisite: HEFS-236 or equivalent.  
4.000 Credit hours

### **FCS 739 - Thesis Research**

Research problems in food or nutrition.  
3.000 Credit hours

### **FCS 740 - Community Nutrition**

Application of the principles of nutrition to various community nutrition problems of specific groups (geriatrics, preschoolers, adolescents and expectant mothers). Evaluation of nutrition programs of public health and social welfare agencies at local, state, federal and international levels.  
Prerequisites: FCS 357. (F;S;.SS)  
3.000 Credit hours

### **FCS 760 - Gradu Semi in Fam and Con Sci**

This course provides opportunities for the presentation and discussion of selected topics of interest such as faculty and student research interests, communication, problem solving, professional development, and current issues and trends. Prerequisite: Graduate Standing. (F;S;SS)  
1.000 Credit hours

### **FCS 784 - Practicum in Food and Nutri**

Field experiences with private or public agencies. Prerequisite: Students must have completed at least 12 credit. (F;S;SS)  
3.000 TO 10.000 Credit hours

### **FCS 789 - Graduate Seminar**

1.000 Credit hours

### **FCS 797 - Thesis Research**

Research problems in food or nutrition.  
Prerequisites: Advisor Approval. (F;S;SS)  
Note: May be repeated for credit.

1.000 TO 6.000 Credit hours

### **FCS 999 - Con't of Thesis for FCS**

Research problems in food or nutrition.  
Note: May be repeated for credit.  
1.000 Credit hours

## **FIN Accounting and Finance**

### **FIN 750 - Financial Management**

This course provides an overview of three major areas of corporate finance: Investment (Capital Budgeting), Financing, and Pay-out Policies. Students will gain insight on utilizing relevant information (financial and non-financial) to make informed decisions that are vital to modern firms. Emphasis is geared toward gaining an in-depth understanding of the financial implications of managerial operational decisions.  
Prerequisites: Minimum grade of C in FIN 253 or ACCT 608 or permission of instructor. (F;S)  
3.000 Credit hours

## **GRAD Graduate College**

### **GRAD 799 - Continuation Residency**

Meets requirement for continuous enrollment during final term prior to graduation when all course credit requirements (including thesis or dissertation) have been completed. This course is non-graded, may receive a grade of S/U, and credit for this course does not count toward the degree. May be repeated twice. Prerequisites: None. (F;S;SS)  
1.000 TO 3.000 Credit hours

### **GRAD 999 - Continuation Residency**

Meets requirement for continuous enrollment during final term prior to graduation when all course credit requirements (including thesis or dissertation) have been completed. This

course is non-graded, may receive a grade of S/U, and credit for this course does not count toward the degree. May be repeated twice. Prerequisites: None. (F;S;SS)  
1.000 TO 3.000 Credit hours

## **HIST History and Political Science**

### **HIST 633 - Independent Study in History**

By arrangement with instructor. (F;S;SS)  
Note: May be repeated for credit.  
1.000 TO 3.000 Credit hours

### **HIST 714 - Colloquium in World History**

This course requires students to engage in intensive reading, discussion, and written analysis of selected topics in world history. It is designed to enable prospective teachers to strengthen their delivery of world history surveys and electives at the level of secondary education. Prerequisite: Graduate Standing. (F;S;SS)  
3.000 Credit hours

### **HIST 715 - Colloquium in U.S. History**

This course provides a broad sweep of core literature of United States history from European contact to the present. Students will engage in intensive reading, discussion, and written analysis of selected topics in United States History. This course is designed to enable prospective teachers to strengthen their delivery of U.S. history surveys and electives at the secondary education level. It is required of all MAT History Education students, but is open to other interested graduate students. Prerequisites: None. (F;S)  
3.000 Credit hours

### **HIST 735 - Historical Thinking**

This course introduces students to the intellectual currents and schools of thought that have characterized the study of history over time. Through the use of

methodological and conceptual frameworks, students will engage with historical debates. They will also develop and write a major research paper. Prerequisites: None. (F;S)  
3.000 Credit hours

### **HIST 740 - Hist Soc Sci Contemp Wrld Prob**

Readings, discussions, and reports on the relationships between history and the social sciences as a whole, as well as their combined roles in dealing with contemporary world problems.  
3.000 Credit hours

## **HORT Natural Resource & Environmental Design**

### **HORT 600 - Advanced Tech for Hor Crop Im**

This course studies principles and techniques of plant cell, tissue and organ culture, embryogenesis and organogenesis breeding and genetic transformation, and their applications in horticultural crop improvement. Prerequisites: NARS 110, HORT 334. (F)  
0.000 OR 3.000 Credit hours

### **HORT 602 - Grapes and Small Fruits**

This course covers principles and production practices of the various varieties of grapes and small fruits produced in North Carolina. Prerequisite: NARS 110. (F;S)  
3.000 Credit hours

### **HORT 603 - Specialty Crops**

This course will cover production aspects of some specialized crops, like Mushrooms, Herbs and Medicinal plants. Prerequisites: NARS 110. (F;S)  
3.000 Credit hours

### **HORT 608 - Special Probs in Horticulture**

This course involves work along special lines given largely by the project method for advanced undergraduate and graduate students who have the necessary preparation. Special arrangement with instructor required. (F:S:SS)  
3.000 Credit hours

### **HORT 610 - Season Exten Sustainable Pro**

This course covers different options for producing vegetables, small fruits or other edible plant requiring limited space in a urban environment. From the production under protected conditions to season extension, what are the different possibilities offered to growers. Prerequisite: NARS 110. (F;S)  
2.000 Credit hours

### **HORT 611 - Prac in Sea Exten in Sus Prac**

This course offers practical experience on season extension and production of vegetables, small fruits or other edible plants requiring limited space in greenhouse, high tunnel and other techniques. Prerequisites: NARS 110, HORT 610 (or concurrent registration) (F;S)  
1.000 Credit hours

## **HPED Human Performance & Leisure Studies**

### **HPED 600 - Independent Study**

This course is an independent study in the area of Human Performance and Leisure Studies. Content is determined by the student and the course instructor. Prerequisites: Graduate student standing; Consent of the academic advisor, course instructor, and departmental chair. (F;S;SS)  
3.000 Credit hours

### **HPED 610 - Health Educa Safety and Liabil**

This course is designed to study research-based practices regarding health and safety issues, health-related fitness appraisals, and legal/liability principles pertaining to physical education activities. Emphasis is also focused on the effects of substance abuse on human performance and behavior. In addition, strategies in adapting health-related fitness appraisal activities for individuals with special needs will be examined. Prerequisites: Undergraduate SSFM majors with senior status and a 3.25 GPA, or graduate student standing. (F;S;SS)  
3.000 Credit hours

### **HPED 611 - Understanding Human Motor Dev**

This course is designed to develop the knowledge and skills necessary in understanding human motor development. Course content includes fundamental movements, movement concepts, growth and motor development, and the role of perception in movement. In addition, development and implementation of developmental movement programs, including assessment of motor ability will be equally emphasized with considerations for individuals with special needs. Prerequisites: HPLS M.A.T. candidate, or senior undergraduate SSFM major with 2.8 GPA and letter of support from academic advisor. (F;S;SS)  
3.000 Credit hours

### **HPED 612 - Movement Forms and Motor Learn**

This course is designed to address theoretical and practical issues pertaining to the understanding of humans' development of various dance and rhythmic skills, as well as analyses of individual, dual, and team sport skills. Moreover, emphasis is placed on humans' learning of motor skills with respect to assessment and programming developmentally appropriate activities.



Prerequisites: Undergraduate SSFM majors with senior status and a 3.25 GPA, or graduate student standing. (F;S;SS)  
3.000 Credit hours

### **HPED 613 - Phil Found Pedagogy in PE**

This research-based course is designed to explore and address current issues and trends that affect health education today. Course content includes, but is not limited to: global health, environmental health, and health concerns of a diverse population. Prerequisites: Undergraduate SSFM majors with senior status and a 3.25 GPA, or graduate student standing. (F;S;SS)  
3.000 Credit hours

### **HPED 615 - PETE Intern Peri of 15 Con wks**

This course is designed to facilitate students' teaching and implementation of empirical-based pedagogical best practices; respond to learners' exceptionalities/diversities; appropriate use of North Carolina course of study; use of technology to create supportive learning environments; participation in other school-based activities (e.g., Guidance activities, child accounting, co-curricular activities, parent-teacher associations, teachers' meetings), which will aid in developing a Master teacher. In addition, student teachers must complete one semester of actual supervised teaching, which meets North Carolina Department of Public Instruction (NCDPI) required contact hours of teaching learning in the public schools. Prerequisites: HPLS M.A.T. students with a minimum GPA of 3.0 (F;S)  
6.000 Credit hours

### **HPED 619 - Scien Foun for K-12 Phys Educa**

This course is designed to provide K-12 physical educators with an understanding of principles and theories related to exercise physiology, applied anatomy, and sports

medicine. Prerequisites: Undergraduate SSFM majors with senior status and a 3.25 GPA, or graduate student standing. (S)  
3.000 Credit hours

### **HPED 660 - Pro Dev in Adapted Phys Activi**

This course is designed to study the various approaches in developing adapted physical activity programs for individuals with disabilities, with emphasis on an ecological approach. Content focus is placed on inclusion, diversity and non-categorical elements of program development, implementation and evaluation. A practicum is required. Prerequisites: HPLS M.A.T. students with a minimum GPA of 3.0 (F;S;SS)  
3.000 Credit hours

### **HPED 700 - Eval Atypical Motor Perform**

This course is designed to study the various methods of assessing and evaluating atypical motor performance. Emphasis is placed on ecological based data collection, interpretation, and instruction. A practicum is required.  
3.000 Credit hours

### **HPED 714 - Health Educa in Grades K-12**

This research-based course focuses on innovative teaching-learning experiences for health educators. Course content will include educational theory, curriculum materials, technology resources, instructional methodologies, and assessment/evaluation techniques. Includes field experience hours in public schools. Prerequisite: Graduate student standing. (F;S;SS)  
3.000 Credit hours

### **HPED 735 - Sport Psychology Practicum**

This course provides supervised experiences in the organization, administration and

evaluation of applied sport psychology programs, generally involving psychological skills training with competitive sport participants.

3.000 Credit hours

**HPED 742 - Admin  
Interscholastic/Collegia**

This course is designed to provide management theories and principles for the organization and administration of interscholastic and intercollegiate athletics. The components of budgeting, scheduling, staffing, coordination, planning and legal liability will be thoroughly discussed.

3.000 Credit hours

**HPED 750 - 21st Century Health  
Education**

This health course is designed to provide students with research-based information and strategies for establishing a positive and productive environment for a diverse population of students, their families, and the local community. Prerequisites:

Graduate Student Standing. (F;S;SS)

3.000 Credit hours

**HPED 751 - Advanced Peda Instru Phys  
Edu**

This research-based course addresses advanced pedagogical practices in physical Education and Health. Topics include updated information about the knowledges, skills and dispositions critical to best-practices teaching as well as philosophical and practical approaches to collection, management, analysis, and presentation of formative and summative data.

Prerequisites: Graduate student standing.

(F;S;SS)

3.000 Credit hours

**HPED 761 - Early Chldhd Adapt Phys  
Activ**

This course focuses on the planning, implementation and evaluation of inclusive motor development programs for very young children with special needs. Emphasis is placed on current practices in assessment and programming, family involvement, and playground safety. A practicum is required.

3.000 Credit hours

**HPED 762 - Tchng Adapted Phys Activity**

This course is designed to study and apply various instructional approaches to the teaching of adapted physical education in an inclusive setting. Emphasis is placed on instructional styles and strategies, organizational techniques, and teaching effectiveness within an ecological framework. Internship is required.

3.000 Credit hours

**HPED 797 - Research Seminar**

This course is designed to provide the students with a culminating experience by conducting writing and presenting a research project to a forum of students and faculty.

Prerequisites: Graduate student standing, and the completion of CUIN 711, HPED 784, and HPED 786. The student should also have completed 50% of the courses in the M.S. plan of study. (F;S;SS)

3.000 Credit hours

**HPED 799 - Thesis**

An in-depth research project in the area of physical education. Each student will have an advisor and Thesis Committee, in accordance with the procedures within the Graduate School, who will provide guidelines in the completion of the study. Each student will present his/her findings and will provide a successful defense before the Thesis Committee.

3.000 Credit hours

**HPED 821 - Sport Facili and Event  
Manage**

This course provides students with an understanding of the complexity involved in sport facility and event management. Sport facility management includes a variety of activities such as planning and designing a sports facility, staff management, facility marketing, developing revenue streams, and facility scheduling and operating. Sport event management consists of identifying event goals and coordinating staff in order to achieve goals with the available resources. Prerequisite: Graduate Student Standing. (F;S;SS)  
3.000 Credit hours

### **HPED 822 - Sport Market and Sponsorship**

This course is designed to facilitate efficient and effective planning of sport events incorporating principles of marketing and sponsorships. Topics include sport programs, facilities, personnel, promotion, public relations, strategic market planning, marketing information management, marketing communications, branding and sponsorship sales. Prerequisite: Graduate Student standing. (F;S;SS)  
3.000 Credit hours

### **HPED 885 - Spe Top in Sport Admin Manage**

This course examines current topics in the field of sport management and administration. The course includes research, discussion, and presentations based on current trends affecting policies, procedures, and practices in the sport industry. Prerequisite: Graduate Student Standing. (F;S;SS)  
3.000 Credit hours

## **INST Administration & Instructional Service**

### **INST 605 - Computers in Education**

The student will be introduced to the various uses and functions of the computer in educational settings. The integration of the computer as a tool for instructor and student use; and its use as a tutor for student use in a variety of formats will be addressed. A basic introduction to the Internet and the World Wide Web will also be provided. Students will also explore different hardware and software configurations. This is not a course for introducing computer usage.  
3.000 Credit hours

### **INST 680 - Cataloging of Media Materials** 3.000 Credit hours

### **INST 700 - Instructional Design** 3.000 Credit hours

**INST 703 - Leadership and Management**  
This course gives candidates the knowledge, skills, and dispositions to exercise management skills and provide leadership within their areas of expertise. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

**INST 705 - Instruct Tech Serv Bus Indust**  
This course introduces students to the impact of technology within business and industry and how learning in that environment warrants instruction that differs from that of traditional education. Students will have the opportunity to (a) investigate various learning and presentation needs of business and industry clients; and (b) apply different delivery methods and techniques, and technological applications to specific audiences in that environment.  
3.000 Credit hours

**INST 721 - Multimedia Develop and Evaluati**  
3.000 Credit hours

**INST 722 - Adv Internet Use in Education**  
3.000 Credit hours

**INST 723 - Media and Tech in the Schools**

This course prepares candidates to plan, implement, administer, and evaluate media and technology resources in schools. Issues in media and technology selection and use (including ethical use) are discussed. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

**INST 735 - Assistive Tech and Di Learners**

This course uses Universal Design as a foundation for learning and teaching. Course participants will learn strategies and techniques based on Universal Design principals to design instruction that makes curriculum accessible to All learners, including those with disabilities. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

**INST 752 - Designing Courses Online Deliv**  
3.000 Credit hours

**INST 785 - Internship in Instruc Tech**  
This course is a professional laboratory designed to provide the student with on-the-job training and direct experiences relating to the professional track she/she has chosen within the program. Students have an opportunity to develop research in an area related to practical experience. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

**ISEN Industrial & Systems Engineering**

**ISEN 600 - Survey of Indust Engin Topics**  
This course will introduce topics in the following areas of Industrial and Systems

Engineering: Engineering Economy, Linear Programming, Production Control, Methods Engineering, and Statistical Process Control. Prerequisites: Senior/Graduate Standing. (F;S)  
3.000 Credit hours

**ISEN 625 - Information Systems**

This course introduces the planning, design, implementation and evaluation of industrial information systems. Analysis and design techniques, organization of data, current software tools, client-server architectures, and current database technologies are presented. The role of information systems in global manufacturing, distribution, and services is addressed. Design projects are required. Prerequisites: Senior/Graduate Standing. (F;S)  
3.000 Credit hours

**ISEN 628 - Six Sigma Quality**

This course covers the current Six Sigma body of Knowledge for process engineering and improvement as well as Lean concepts and tools. Topics covered include problem identification and implementation of improved operations and processes. This course prepares students to take the SIX Sigma Certification Exam. A project is required. Prerequisites: Consent of Instructor. (F;S)  
3.000 Credit hours

**ISEN 648 - Biomechanics**

This course covers human biomechanical and physiological behavior during work. Quantitative methods using engineering mechanics principles and computer simulation are emphasized. Prerequisites: Senior/Graduate Standing. (F;S)  
3.000 Credit hours

**ISEN 655 - Prod Planning & Scheduling**

This course focuses on the design, control and underlying behavior of manufacturing and service systems with emphasis on quantitative and information technology methods. Topic covered in this course include demand forecasting, inventory management, aggregate planning, operations scheduling, Material Requirements Planning and Manufacturing Resource Planning. Just-in-time, Theory of Constraints and Supply Chain Management. Projects will be required. Prerequisite: Senior/Graduate Standing. (F;S)  
3.000 Credit hours

#### **ISEN 658 - Project Management**

This course addresses project proposal preparation, resource and cost estimation, project planning, organizing and controlling, network diagrams, and computerized project planning systems. Prerequisite: Senior/Graduate Standing. (F;S)  
3.000 Credit hours

#### **ISEN 664 - Systems Safety Eng & Risk Anal**

This course presents the principles and methods of system safety management and risk analysis. Quantitative and qualitative methods and their applications in safety and risk analysis of human-machine systems are emphasized. Prerequisites: Senior/Graduate Standing. (F;S)  
3.000 Credit hours

#### **ISEN 665 - Human Machine Systems**

This course introduces behavioral and psychological factors such as sensory, perception and attention, decision-making and cognitive processes. This course emphasizes the applications of these factors to the design and development of man-machine systems. Design projects are required. Prerequisites: Senior/Graduate Standing in ISE or Consent of Instructor. (F;S)

0.000 OR 3.000 Credit hours

#### **ISEN 675 - Design and Analysis of Experi**

This course addresses various experimental designs, to analyze data for research projects, process improvements, human factors studies, and surveys. Designs covered include Latin Squares, complete and incomplete block designs, one, two and three variable factorials, fractional factorials, nested designs, and 2k designs. Suitable laboratory apparatus will be set up to study to effect of design parameters on selected response. Statistical software will be utilized to analyze results. Parametric statistics such as analysis of variance (ANOVA) are introduced. Prerequisites: Senior/Graduate Standing. (F;S)  
3.000 Credit hours

#### **ISEN 685 - Selected Topics in ISEN Engi**

Selected engineering topics of interest to students and faculty. The topics will be selected before the beginning of the course and will be pertinent to the programs of the students enrolled. Prerequisites: Senior/Graduate Standing. (F;S) Note: May be repeated for credit.  
1.000 TO 3.000 Credit hours

#### **ISEN 694 - Special Projects**

Study arranged on a special engineering topic of interest to student and faculty member, who will act as advisor. Topics may be analytical and/or experimental and encourage independent study. Prerequisite: Consent of the instructor. M.S. and Ph.D. students only. (F;S) Note: May be repeated for credit.  
1.000 TO 3.000 Credit hours

#### **ISEN 721 - Systems Engineering Models**

This course presents an overview of modern quantitative and computational techniques for system modeling, design and control. Topics include fuzzy set theory, neural

network, control theory, optimization search methods, Petri-nets, and knowledge-based systems. Prerequisite: Graduate Standing. (F;S)

3.000 Credit hours

### **ISEN 731 - Engineering Cost Control**

This course is designed to emphasize the use of cost data by engineers in support of the financial management function. Cost functions, cost behavior, cash control, budgeting, and cash-flow analysis are discussed. Prerequisites: Graduate Standing. (F;S)

3.000 Credit hours

### **ISEN 735 - Human Computer Interface**

This course provides a fundamental coverage of topics in human-computer interface (HCI). The primary emphasis is on the impact of human characteristics and the use of information processing models for HCI-design, usability evaluation, virtual reality, and multimedia systems.

Prerequisite: Graduate Standing. (F;S)

3.000 Credit hours

### **ISEN 742 - Linear Optimization**

This course addresses formulation, solution techniques and applications of linear programming problems. Topics covered include simplex-method, revised simplex method, duality, sensitivity analysis, large scale liner programs, column generation, Dantzig-Wolf decomposition, interior point methods, and computer solutions.

Prerequisites: Consent of Instructor. ((F;S)

3.000 Credit hours

### **ISEN 745 - Advanced Com Inte Produc Sys**

This course addresses the principles relating to integration issues for an automated manufacturing enterprise. Topics include control architectures, communication networks and standards for graphical

information interchange. Current research areas will be discussed. Design projects are required. Prerequisite: Graduate Standing. (F;S)

3.000 Credit hours

### **ISEN 792 - Indus Sys Engi Master's Semi**

This course introduces contemporary industrial and systems engineering topics via talks by individuals from industry, government, and academe. Prerequisites: Graduate Standing in ISE. (F;S) Note: May be repeated for credit.

1.000 Credit hours

### **ISEN 794 - Masters Supervised Research**

This course provides students with the experience of assisting in all aspects of planning and completing research projects.

Prerequisites: Graduate Standing in ISE.

(F;S)

3.000 Credit hours

### **ISEN 796 - Masters Project**

This course provides the student an opportunity to complete a comprehensive Industrial and Systems Engineering project of their choice under the supervision of a faculty advisor. A project is an application of Industrial and Systems Engineering methods and techniques to a specific problem. Students are required to complete a project proposal and a final defense in accordance with departmental guidelines.

Prerequisites: Graduate Standing in ISE.

(F;S)

3.000 Credit hours

### **ISEN 797 - Master's Thesis**

This course provides the student an opportunity to complete a piece of original research, of their choice, in Industrial and Systems Engineering, under the supervision of a faculty advisor. Students are required to complete a thesis proposal and a final defense in accordance with

departmental guidelines. Prerequisites: Graduate Standing in ISE. (F;S) Note: May be repeated for credit.

1.000 TO 6.000 Credit hours

### **ISEN 799 - Continuation/Residency**

Meets Graduate School requirements for continuous enrollment during final term prior to graduation when all degree requirements (including thesis or project) have been completed. This course is non-grated, and credit for this course does not count toward the degree. May be repeated twice. Prerequisites: Graduate Standing in ISE. (F;S) Note: May be repeated for credit.

1.000 TO 3.000 Credit hours

### **ISEN 813 - Cognitive Systems Engineering**

This course examines the principles, theories, and applications of the cognitive basis of system design. Topics include models of human and machine information processing, mental models, human error, human-centered design, abstraction hierarchy, ecological interface, cognitive task analysis, multi-flow models, activity-behavior models, and theories of complexity in human machine systems. Prerequisite: Graduate Standing and Consent of Instructor. (F;S)

3.000 Credit hours

### **ISEN 814 - Adv Topics Human Machine Sys**

This course examines advanced topics in human-machine systems. Topics covered include supervisory control, human aspects of fixed and programmable automation, theories and models of complex systems, collaborative work support systems, human attention and cognitive control of dynamic actions, and tele-operations. Applications include supervisory control in transportation, process, space operations,

waste and hazardous handling, manufacturing, and other applications of automated systems. Prerequisites: Graduate Standing and Consent of Instructor. (F;S)  
3.000 Credit hours

### **ISEN 821 - Multivariate Stat for Engineer**

This course focuses on methods for statistical analysis of multivariate data. Topics include: dimensionality, multidimensional classification and clustering, unstructured multi-response sampling, analysis of covariance structures, such as principal components, factor analysis and canonical correlation analysis, and multivariate normal distribution and analysis of multivariate means. Prerequisite: Graduate Standing and Consent of Instructor. (F;S)

3.000 Credit hours

### **ISEN 831 - Service Sector Engineering**

This course focuses on the application of modeling and analysis of enterprises in the service sector of an economy. Topics include the role of the service sector in an economy, special characteristics of service operations, structuring the service enterprise, facility design for services, service quality, quantitative models for managing services. Applications in the financial services, health care, and other sectors will be emphasized. Prerequisite: Graduate Standing and Consent of Instructor. (F;S)

3.000 Credit hours

### **ISEN 833 - Supply Chain Syst Engineering**

This course addresses the analysis and design of logistics and supply chain systems. Topics covered include: logistics and supply chain characterization, site location, mode selection, distribution planning, vehicle routing, demand management, replenishment management, geographic information systems and real-time logistics

control issues. Prerequisites: Graduate Standing and Consent of Instructor. (F;S)  
3.000 Credit hours

### **ISEN 841 - Integer and Network Optimiza**

This course addresses formulation and solution techniques for integer programming problems and network optimization problems. Topics covered include integer programming models, branch and bound method, transportation, assignment, and transshipment problems, and network flow problems such as shortest-path, maximum-flow, activity networks, minimum-cost network flow, and minimum spanning tree. Prerequisites: Graduate Standing and Consent of Instructor. (F;S)  
3.000 Credit hours

### **ISEN 843 - Queuing Theory**

This course presents stochastic models and solution techniques for such models. Specific topics include elements of queuing systems, measures of performance, arrival processes, steady state analysis, stationary arrivals, controlling service processes, priority queues, and queuing networks. Prerequisite: Graduate Standing and Consent of Instructor. (F;S)  
3.000 Credit hours

### **ISEN 844 - Reliability and Maintenance**

This course reviews the statistical concepts and methods underlying procedures used in reliability engineering. Topics include the nature of reliability and maintenance, life failure and repair distributions, life test strategies, and complex system reliability including: series/parallel/ standby components with preventive maintenance philosophy. Analytical models are emphasized. Prerequisite: Graduate Standing and Consent of Instructor. (F;S)  
3.000 Credit hours

### **ISEN 851 - Integrated Manu Control Sys**

This course provides an advanced study of systems used for manufacturing execution and shop floor control. Traditional control and adaptive control algorithms and applications for manufacturing are explored. Integrated control system functions include scheduling, execution planning, supervisor control, human machine interface, process control, quality control, and information acquisition. Prerequisite: Graduate Standing and Consent of Instructor. (F;S)  
3.000 Credit hours

### **ISEN 852 - Integrated Product & Proc Desi**

This course provides an integrated approach to the design and manufacture of a new product. Topics include product requirements, concept generation and selection, design, product optimization, tolerances, prototype 32 development, design for manufacturability and assembly, process optimization, and quality function deployment. Prerequisite: Graduate Standing. (F;S)  
3.000 Credit hours

### **ISEN 853 - Enterprise Integration**

This course is directed toward development and contribution to the advancement of a unified framework for conceptualizing, designing, modeling, and operating advanced integrated manufacturing systems. It builds upon emerging developments in computer and communications technologies and conceptual breakthroughs regarding the nature and behavior of integrated enterprises. Prerequisites: Graduate Standing and Consent of Instructor. (F;S)  
3.000 Credit hours

### **ISEN 861 - Nano Micro and Bio Manufactur**

This course addresses the translation of fundamental nano and bio technology



concepts to practical industrial applications. Topics include the design , prototyping and development of nano/micro and bio manufacturing techniques. Supporting infrastructure, measurement tools, characterization devices, and positioning systems needed for nano/micro and bio manufacturing are discussed. current state-of-the-art research areas are discussed. Prerequisites: Consent of Instructor. (F;S) 3.000 Credit hours

### **ISEN 885 - Ad Spe Topics in ISEN SYS EN**

The course will address a current body of knowledge in Industrial and Systems Engineering with a research orientation. Term papers and projects will be required. Prerequisites: Graduate Standing and Consent of Instructor. (F;S) Note: May be repeated for credit. 3.000 Credit hours

### **ISEN 992 - Doctoral Sem in Indus Sys Engi**

The course will present potential dissertation topics and research work-in-progress by faculty members and doctoral students, and talks by eminent practitioners and researchers on classical and contemporary topics in Industrial Engineering. Pass/Fail evaluation only, no letter grade will be given. Prerequisites: Doctoral Standing in ISE. (F;S) Note: May be repeated for credit. Note: May be repeated for credit. 1.000 TO 3.000 Credit hours

### **ISEN 994 - Doctoral Supervised Rsrch**

This is supervised research under the direction of a member the Graduate Faculty. This research should lead to the identification of a dissertation topic. Pass/Fail evaluation only, no letter grade will be given. Prerequisites: Doctoral Standing in ISE. (F;S)

3.000 Credit hours

### **ISEN 995 - Doctoral Preliminary Exam**

3.000 Credit hours

### **ISEN 997 - Doctoral Dissertation**

This course provides the student an opportunity to complete a significant piece of original research, of their choice, in industrial engineering, under the supervision of a faculty advisor. Students are required to complete a dissertation proposal and a final defense in accordance with departmental guidelines. Prerequisites: Doctoral Standing in ISE and INEN 995. (F;S) Note: May be repeated for credit.

1.000 TO 18.000 Credit hours

### **ISEN 999 - Continuation/Residency**

Meets Graduate School requirement for continuous enrollment during final term prior to graduation when all degree requirements (including dissertation) have been completed. This course is non-graded, and credit for this course does not count toward the degree. May be repeated twice. Prerequisites: Doctoral Standing in ISE. (F;S) Note: May be repeated for credit. 1.000 TO 3.000 Credit hours

## **ITT Computer Systems Technology**

### **ITT 605 - Prin of Computer Networking**

This course explores all the hardware and software that drives local and Internet computing. Special emphasis is placed on connectivity and throughput. Prerequisite: ECT 313 3.000 Credit hours

### **ITT 792 - MS Rsrch Thesis for In Tech II**

This course is a continuation of ITT 791. Major activities conducted in the course include circulating the tentative proposal among committee members and carrying out

the proposed investigation. ITT 791.  
(F;S;SS)  
1.000 Credit hours

### **ITT 793 - Master's Re The Infor Tech III**

This course is a continuation of ITT 792. Major activities conducted in the course include preparing a preliminary thesis document and conducting a preliminary oral examination defense of the document. Prerequisites: ITT 792. (F;S;SS)  
2.000 Credit hours

### **ITT 794 - Master's Re The Infor Tech IV**

This course is a continuation of ITT 793. Major activities conducted in the course include preparing the final thesis document and conducting the final oral examination defense of the document. Prerequisites: ITT 793. (F;S;SS)  
2.000 Credit hours

## **LASC Animal Science**

### **LASC 660 - Tech Prep/Immu/Micro/Rad**

Special expertise in either the preparation of animal models for classroom, museum, and special display, the theoretical and practical aspects of immunological techniques, electron and light microscopy, radiology, tissue culture or histochemistry.

Prerequisite: Senior standing or special departmental permission. (F;S;SS)  
0.000 OR 3.000 Credit hours

## **LEST Leadership Studies & Adult Education**

### **LEST 800 - Leadership Theories**

This course explores the theoretical nature of leadership. The emphasis is on the application of theories of leadership in political, economic, social, and global contexts. A critical examination of the leadership literature and research are used to

develop an appreciation for the contingency and interdisciplinary nature of leadership.  
3.000 Credit hours

### **LEST 802 - Decision Making Theor/Strat**

This course focuses on the development and enhancement of strategic decision-making capabilities. It explores the theories and principles of executive decision-making processes such as qualitative decision-making models and techniques. A related emphasis is on effective communication with diverse groups, and implementation and evaluation of strategic decisions. Other topics include power and politics, managerial cognition, strategy formulation, organizational learning, organizational information processing, ethical decision-making, and the influence of technology on strategic decisions.  
3.000 Credit hours

### **LEST 810 - Ethics & Social Responsibility**

This course focuses on the ethical and legal dimensions of leadership, including multiple philosophies and theories. The course will provide an examination and interpretation of complex issues from the perspective of ethical leadership and diversity.  
3.000 Credit hours

### **LEST 811 - Execu Leader and Group Dynam**

This course focuses on personal/professional development relative to executive leadership. The scholarship of engagement is combined with practical experiences including individual projects, invited guest presentations, individual and group self-assessments of leadership effectiveness, and other developmental activities, and seminar type roundtables with leaders from the healthcare, business, economic development, politics and philanthropy industries. Prerequisite: None. (F;S;SS)

3.000 Credit hours

**LEST 812 - Contemp Issues Cul Diversity V**

This course focuses on current issues in diverse cultures and the development of cultural understanding and knowledge of the literature, history, language, art, music, and social/political systems of a diverse culture. 3.000 Credit hours

**LEST 813 - Leadership Devel Prin and Prac**

This course focuses on the theory, concepts and methods of leadership development, leadership development and evaluation research, and developmental leadership assessment. The course provides grounding in adult development theory and learning theory and applications to leader development both on and off the job. Student opportunities for research and leadership self-development are major features of the course. Prerequisites: LEST 800, or permission of the instructor. (F;S;SS) 3.000 Credit hours

**LEST 815 - Research Design and Methodolo**

This course provides an overview of quantitative, qualitative, and mixed methods research paradigms and introduces students to tools necessary for the design of a methodologically sound study. Prerequisites: LEST 801 and 802, or permission of the instructor. (F;S;SS) 3.000 Credit hours

**LEST 817 - Field Studies in Global Leader**

Students work side-by-side with faculty in globally-dispersed field settings to acquire practical experience in leadership, service and problem-solving in diverse cultural, social and political contexts. Prerequisite:

Instructor Approval. (F;S;SS)  
3.000 TO 6.000 Credit hours

**LEST 818 - Strategic Planning Orga Dynam**

This course explores the leadership implications of strategic planning in formal organizations across a variety of settings. It critically examines strategic planning constructs ranging from SWOT/PEST analyses to goal setting as well as major theories in the study of effective organizational designs. Emphases include analysis of (a) the leadership dynamics inherent in the strategic planning process and (b) vertical and horizontal interdependent relationships among components of organizational structures. Prerequisites: LEST 800. (F;S;SS) 3.000 Credit hours

**LEST 830 - Higher Education Fi and Budget**

This course is designed to provide students with an overview of the economics and finance of higher education and community colleges in the United States, with an emphasis on school finance case laws, analysis of financial policies at the local, state, and national levels. Students will explore sources of revenues, fund raising and development, types of expenditures, tuition and financial policies, budgeting and accounting practices in higher education and community colleges. Prerequisites: LEST 800: Leadership Theories, or permission of instructor. (F;S;SS) 3.000 Credit hours

**LEST 831 - Higher Educa Policy and Gover**

This course addresses external and internal models of governance and policy development at the local, state, and federal levels. Students will explore policy and governance strategies within local and state

levels. These strategies are critical to higher education and community college effectiveness. Prerequisites: LEST 800: Leadership Theories, or permission of instructor. (F;S;SS)  
3.000 Credit hours

### **LEST 832 - Com College Leadership and Adm**

This course introduces students to the leadership and management concepts and practices in community colleges. Students will explore leadership styles, the use of power, community college culture, and organizational behavior. They will examine administrative practices and responsibilities within instructional and student services divisions and operational services units as well as the management of human, fiscal, and material resources within the community college system. Prerequisites: LEST 800: Leadership Theories, or Permission of instructor. (F;S;SS)  
3.000 Credit hours

### **LEST 835 - Leadership for Di and So Jus**

This course examines culturally relevant leadership and social justice leadership as approaches to leadership in K-20 settings. The examination is guided by relevant social science theories and leadership theories. Prerequisites: LEST 800. Leadership Theories. (F;S;SS)  
3.000 Credit hours

### **LEST 841 - Leadership and Politics**

This course examines political leadership at the state level, emphasizing how political and personal ideology as well as external influences frame policy decisions. Course activities will include research and applied scholarship projects. Prerequisites: LEST 800: Leadership Theories. (F;S;SS)  
3.000 Credit hours

### **LEST 842 - Psyc of the African Ameri Expe**

This course is designed to provide students with an in- depth examination of the factors that have historically, culturally, politically, educationally, and scientifically shaped the consciousness of African Americans. Specific attention will be given to an analysis of groundbreaking issues faced by early African American psychologists as well as contemporary issues facing African American communities Prerequisites: LEST 800: Leadership Theories and LEST 810 Ethics & Social Responsibility. (F;S;SS)  
3.000 Credit hours

### **LEST 843 - Race and Health Equity**

This course provides students with an understanding of how social factors contribute to racial/ethnic, socioeconomic and gender disparities in health and health care. Students will also examine the ways in which neighborhood and community context, as well as inequalities in socioeconomic status, materially shape health and access to health care services. Prerequisites: LEST 800: Leadership Theories and LEST 810 Ethics & Social Responsibility. (F;S;SS)  
3.000 Credit hours

### **LEST 845 - Women and Leadership**

This course is designed to examine (A) theories (e.g., feminist, womanist, critical, critical race, etc.), (b) leadership models (e.g., servant, transformative, authentic, adaptive, etc.), and (c) issues (e.g., sexism, racism, glass ceiling, ethics of caring, double jeopardy, gender roles, etc.) related to women in leadership positions across different environments. Prerequisites; LEST 800. (F;S;SS)  
3.000 Credit hours

### **LEST 850 - Leadership Global Econ Society**

This course will focus on effective and ethical global leadership in the areas of decision-making, problem-solving, competencies for addressing relationships, communication, teambuilding, leading visions into actions. Additionally, the course will emphasize stress and conflict management, interdependent thinking, valuing the ability to advance the work of the institution's place in global society, communities and cultural awareness technology and global perspectives.  
3.000 Credit hours

### **LEST 860 - Qualitative Research**

This course focuses on methods and tools of inquiry of qualitative research, including but not limited to developing case studies, surveys, interviews and narrative observations. Strategies for determining the intertextuality of trends and relationships as revealed in the research will be developed.  
3.000 Credit hours

### **LEST 861 - Computer Aided Research**

This course provides students with background for determining which statistical test to use, running that test, and interpreting results, given a set of data. Though math will be emphasized, major emphasis is on understanding statistical tests. Prerequisites: LEST 862, or permission of the instructor. (F;S;SS)  
3.000 Credit hours

### **LEST 862 - Quantitative Research**

This course provides a fundamental introduction to the field of quantitative research through the development of a knowledge base and an application of research skills and methodologies required to select, read, and interpret relevant professional literature.  
3.000 Credit hours

### **LEST 863 - Statistical Appli and Interpre**

This course focuses on the use of SPSS as a way to run statistical analyses. Determining the appropriate statistical test and interpretation of results are also emphasized. Prerequisites: LEST 862, or permission of the instructor. (F;S;SS)  
3.000 Credit hours

### **LEST 864 - Ethnographic Methods So Sci Re**

This course provides experience in fieldwork methods of observation, interviewing, discourse analysis, and other research strategies from the ethnographic tradition that has developed in anthropology and sociology over the past century. The course examines the ontological assumptions, theoretical perspectives, and ways of writing that are essential for conducting this type of research. Prerequisites: LEST 860, or permission of the instructor. (F;S;SS)  
3.000 Credit hours

### **LEST 865 - Mixed Methods Research**

This course provides a foundation for planning, conducting, and evaluating mixed methods research studies. Prerequisites: LEST 860 and 862, or permission of the instructor. (F;S;SS)  
3.000 Credit hours

### **LEST 885 - Special Topics**

This course allows the introduction of new topics on a trial basis at the doctoral level. The topic of this course will be determined prior to registration. Note: May be repeated for credit.  
3.000 Credit hours

### **LEST 900 - Dissertation Research**

This course focuses on the development of the dissertation proposal. The dissertation research is embedded in the internship experience that ensures a comprehensive

application and utilization of research.  
3.000 Credit hours

### **LEST 930 - Dissertation Writing**

Dissertation writing is the culminating course in the student's doctoral program. The student will demonstrate high levels of scholarly and intellectual activity. Dissertation writing is an original contribution to knowledge in the field of study through disciplined inquiry. This course prepares a student for conducting, writing, and defending the dissertation in accordance with the highest professional standards.  
3.000 Credit hours

### **LEST 984 - Internship in Leadership**

This course provides inquiry, exploration, and hands-on opportunities to observe and participate in leadership decisions. The internship will be one of professional practice internship in a leadership environment. The internship will be with a recognized business, industry, government or non-governmental leader or in an organization that emphasizes leadership. It will inform the student of current practice and support the dissertation research.  
Prerequisite: LEST 800. (F;S;SS)  
3.000 Credit hours

### **LEST 991 - Qualifying Exam**

Students planning to take the qualifying exam should register at the beginning of the semester in which the student plans to take the exam. Prerequisite: Completion of core courses. (F;S;SS)  
0.000 Credit hours

### **LEST 992 - Pro-Seminar Leadership Studies**

This professional seminar provides students with an overview of the LEST doctoral program and an introduction to inquiry and research design in social and behavioral

sciences research. Prerequisite: None.  
(F;S;SS)  
1.000 Credit hours

### **LEST 995 - Doctoral Preliminary Examina**

In this course dissertation advisors will guide their students towards completing the preliminary examination. The preliminary examination will consist of a written proposal and oral defense of the student's dissertation proposal. Grading is pass/fail evaluation only. Prerequisites: Completion of core and research course; completion LEST 991. (F;S;SS)  
2.000 Credit hours

### **LEST 997 - Dissertation**

This course represents the supervised research leading to the dissertation. Doctorial dissertation research will be conducted under the supervision of the dissertation committee chairperson and include regular meetings with the dissertation committee to evaluate progress on the dissertation. Students may enroll for 3-12 credit hours per semester but must complete a total of 12 dissertation credit hours. Prerequisite: LEST 995. (F;S;SS)  
Note: May be repeated for credit  
3.000 TO 12.000 Credit hours

### **LEST 999 - Continua of Doctoral Disser**

This course meets the Graduate School requirement for continuous enrollment during final term prior to graduation when all degree requirements (including dissertation hours) have been completed. This course is non-graded. Credit for this course does not count toward the degree. May be repeated twice. Prerequisites: LEST 997. (F;S;SS)  
1.000 TO 6.000 Credit hours

**MATH Mathematics**

**MATH 603 - Introduction to Real Analysis**

The following topics will be covered in this course: elementary set theory, functions, axiomatic development of the real numbers, metric spaces, convergent sequences, completeness, compactness, connectedness, continuity, limits, sequences of functions, differentiation, the mean value theorem, Taylor's theorem, Riemann integration, infinite series, the fixed point theorem, partial differentiation, and the implicit function theorem. Prerequisite: MATH 211 or consent of the instructor. (DEMAND)  
3.000 Credit hours

**MATH 604 - Mod Geom for Sec School Teach**

Re-examination of Euclidean geometry, axiomatic systems and the Hilbert axioms, introduction to projective geometry and other non-Euclidean geometries will be included. Prerequisites: MATH 600 or consent of instructor. (DEMAND)  
3.000 Credit hours

**MATH 606 - Mathematics for Chemists**

This course includes a review of those principles of mathematics which are involved in chemical computations and derivations from general chemistry through physical chemistry; topics covered include significant figures, methods of expressing large and small numbers, algebraic operations, trigonometric functions and an introduction to calculus.  
3.000 Credit hours

**MATH 607 - Theory of Numbers**

Divisibility properties of the integers, the Euclidean algorithm, congruence, diophantine equations, number-theoretic functions and continued fractions will be studied. Prerequisites: MATH 411 or consent of instructor. (F;S;SS)

3.000 Credit hours

**MATH 608 - Methods of Applied Statistics**

This course introduces the SAS programming language, and uses it in the analysis of variance, both single and multifactor. It includes various methods of hypothesis testing and constructing confidence intervals. The course covers simple and multiple linear regression, including model building and variable selection techniques. Elements of time series and categorical data analysis are covered. Prerequisite: MATH 224.  
3.000 Credit hours

**MATH 623 - Probab Theory & Application**

This course begins with an introduction to sample spaces and probability, including combinatorics. It covers continuous and discrete random variables, including multivariate random variables and expectations; also marginal and conditional distributions are derived. The course introduces moment generating functions, and covers the central limit.  
3.000 Credit hours

**MATH 624 - Theory Methods of Statistics**

This course introduces methods of statistical estimation and inference including the following topics: sufficient statistics, confidence sets, hypothesis tests, and maximum likelihood methods. The theory of uniformly most powerful tests and the Neyman-Pearson Lemma are covered. Other topics include least squares estimation, the linear model, and Bayesian methods. Prerequisite: MATH 623.  
3.000 Credit hours

**MATH 650 - Ordinary Differential Equation**

This is an intermediate course in ordinary differential equations with emphasis on applications. Topics include linear systems and various phase plane techniques for non-linear ordinary differential equations.

Prerequisite: MATH 332. (DEMAND)

3.000 Credit hours

### **MATH 651 - Partial Differential Equations**

This course includes introduction to complex variables and residue calculus, transform calculus, higher order partial differential equations governing various physical phenomena, nonhomogeneous boundary value problems, orthogonal expressions, Green's functions and variational principles. Prerequisites: MATH 332, MATH 432 or consent of instructor. (F;S;SS)

3.000 Credit hours

### **MATH 690 - Scientific Pro for Math Scien**

This course covers the implementation of the computer in the Mathematical sciences. MATLAB will be used to apply algorithms and solve problems in areas such as differential equations and Linear algebra. Probability and statistical problems will be studied through the "R" language.

Prerequisite: None. (F;S)

3.000 Credit hours

### **MATH 706 - Categorical Data Analysis**

This course will include the following topics: Two-Way Contingency Table Inference for Two-Way Table, Models for Binary Response Variables, Log-linear Models, Testing in Loglinear Models, Multinomial Response Models and Estimation Theory for Parametric Models, and Computer Analysis of Categorical Data. Prerequisite: MATH 624.

3.000 Credit hours

### **MATH 708 - Nonparametric Statistics**

The following topics will be discussed in this course: Order Statistics, Run Test for Trend, Goodness of Fit Tests, Rank Tests for One and Two Populations, Linear Rank Statistics, One-Way and Two-Way Nonparametric Analysis of Variance, and applications to practical problems.

Prerequisite: MATH 624.

3.000 Credit hours

### **MATH 712 - Numerical Linear Algebra**

Numerical analysis for solution of linear systems, approximation methods foreign values and eigenvectors, least squares solutions, ill-posed and ill-conditioned systems and error analysis are covered.

Prerequisite: One programming language, MATH 350 or equivalent. (F;S;SS)

3.000 Credit hours

### **MATH 721 - Multivariate Statistical Analy**

Multivariate Normal Distribution, Inference About a Mean Vector, Comparison of Several Multivariate Means, Analysis of Covariance Structure, Analysis of Dispersion, classification and Clustering Techniques and Some Applications of Multivariate Tests will be discussed in this course. Also, practical examples of industrial use will be addressed. Prerequisites: MATH 608 and MATH 624.

3.000 Credit hours

### **MATH 723 - Adv Topics in Applied Math**

This course is designed to cover important topics in applied mathematics that may be desired from time to time for specific students in the graduate program. It may also be used as a vehicle for development of new courses for graduate program students. Prerequisite: consent of the instructor.

3.000 Credit hours



### **MATH 731 - Advanced Numerical Methods**

This course covers numerical methods for solution of parabolic, elliptic and hyperbolic boundary value problems. Problems are selected from engineering applications. Both finite difference and finite element methods are studied. Prerequisite: MATH 360 or equivalent. (F;S;SS)  
3.000 Credit hours

### **MATH 761 - Interdis Comp Sci Proj I**

This course continues development of skills required for independent research of problem-solving in the realm of computational science. The course requires completion of a sound literature review on a topic in computational science, under the guidance of the instructor. Prerequisite: MATH 380. (F;S;SS)  
3.000 Credit hours

### **MATH 781 - Math & Computational Modeling**

This course explores the steps required to model and simulate a system, including discussion of generic governing equations, grid generation, basic numerical schemes, simulation strategies, and data analysis. Both discrete and continuous methods used in scientific applications will be examined. Representative applications include weather prediction, molecular dynamics, scheduling problems, and engine combustion modeling. Prerequisite: MATH 380. (F;S;SS)  
3.000 Credit hours

### **MATH 796 - Graduate Design Project**

This course requires independent project work on an advanced mathematical topic of interest to the student and a faculty member acting as the student's advisor. The topic must be approved by the advisor. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **MATH 797 - Thesis Research in Math**

Students who select the thesis option must do advanced research in an area of interest. The research topic must be approved by the thesis advisor. (F;S;SS)  
3.000 Credit hours

### **MATH 799 - Con't of Thesis for Math**

Note: May be repeated for credit.  
1.000 Credit hours

## **MEEN Mechanical Engineering**

### **MEEN 601 - Continuum Mechanics**

This course covers the applications of the laws of mechanics and thermodynamics to the continuum. Topics include a rigorous development of the general equations applied to a continuum and the application and reduction of the general equations for specific cases of both solids and fluids. Prerequisite: Graduate Standing. (F;S)  
3.000 Credit hours

### **MEEN 606 - Interme Mechanical Vibrations**

This is a course in modeling, analysis and simulation of free and forced vibration of damped and undamped, single and multi-degree of freedom systems. Prerequisite: Graduate Standing. (F;S)  
3.000 Credit hours

### **MEEN 613 - Mechanics of Composite Materi**

This course covers micro and macro mechanics failure theories and design of multilayered-multidirectional fiber reinforced composites. Topics include 2-D and 3-D theory of anisotropy, elasticity, micromechanics, failure theories, classical laminate theory and stress analysis of multidirectional laminates under mechanical and hygrothermal loading. Prerequisite: Graduate Standing. (F;S)

3.000 Credit hours

**MEEN 626 - Advanced Fluid Dynamics**

This course presents general development of basic equations of fluid motion including Navier-Stokes equations, continuity and energy equation. Exact and approximate solutions of the basic equations are presented. Prerequisite: Graduate Standing. (F;S)

3.000 Credit hours

**MEEN 631 - Conduction Heat Transfer**

This course presents the development of the general heat conduction equation and its application to one-, two-, and three-dimensional steady and unsteady boundary value problems. Closed form and numerical solution techniques are addressed.

Prerequisite: Graduate Standing. (F;S)

3.000 Credit hours

**MEEN 643 - Mechanical Instrumentation**

Principles and practices of industrial measurement are presented in this course. Topics include: instrument dynamics and response characteristics; theory of transducers for temperature, pressure, flow, motion, force; and other physical phenomena. Special topics in instruction, data acquisition and data reduction are covered. A project is assigned in an instrumentation application. Prerequisite: Graduate Standing. (F;S)

3.000 Credit hours

**MEEN 654 - Advanced Propulsion**

This covers the analysis and design of individual components and complete air-breathing propulsion systems including turbo fans, turbo jets, ram jets, and chemical rockets. Prerequisite: Graduate Standing. (F;S)

3.000 Credit hours

**MEEN 668 - Compressible Fluid Flow**

The course covers the equations of motion of compressible fluid flow including normal shocks, flow with friction, heating and cooling, supersonic flow; unsteady wave motion, velocity potential equation; linearized flow; conical flow and slender body theory. Prerequisite: Graduate Standing. (F;S)

3.000 Credit hours

**MEEN 685 - Special Topics**

This course is designed to allow the introduction of potential new courses on a trail basis or special content courses on a once only basis at the Master's level. The topic of the course and title are determined prior to registration. Prerequisite: Graduate Standing. (F;S) Note: May be repeated for credit.

3.000 Credit hours

**MEEN 712 - Theory of Elastic Stability**

3.000 Credit hours

**MEEN 716 - Finite Element Methods**

This course covers fundamental concepts of the finite element method for linear stress and deformation analysis of mechanical components. Topics include the development of truss, beam, frame, plane stress, plane strain, axisymmetric isoparametric, solid, thermal, and fluid elements. ANSYS and NASTRAN software will be used for solving particle stress analysis problems. Prerequisite: Consent of instructor.

3.000 Credit hours

**MEEN 792 - Master's Seminar**

This course provides a forum for discussions and reports of subjects in mechanical engineering and allied fields. Prerequisite: Master level standing. Note: May be repeated for credit.

1.000 Credit hours

**MEEN 794 - Master's Supervised Research**

This course is supervised research under the mentorship of a faculty member. It is not intended to serve as the project nor thesis topic of the master's student. Prerequisite: Consent of instructor. Note: May be repeated for credit.  
3.000 Credit hours

**MEEN 797 - Master's Thesis**

Master of Science thesis research will be conducted under the supervision of thesis committee chairperson leading to the completion of the Master's thesis. This course is only available to thesis option students. Prerequisite: Consent of instructor. Note: May be repeated for credit.  
3.000 Credit hours  
3.000 Other hours

**MEEN 799 - Continuation of Thesis**

This is a continuation of the Master of Science thesis research. This course is only available to thesis option students who have completed 6 credit hours of thesis work. Prerequisite: MEEN 797. (F;S;SS) Note: May be repeated for credit.  
1.000 Credit hours

**MEEN 820 - Advanced Thermodynamics**

This is an advanced course covering special topics in classical thermodynamics, statistical thermodynamics and thermodynamics of non-equilibrium processes. Prerequisite: Graduate Standing. (F;S)  
3.000 Credit hours

**MEEN 827 - Multiphase Flow**

This course covers the physics governing multiphase flow. Particle-fluid interaction, particle-particle interaction, and particle-wall interaction are discussed. It includes the description of the macroscopic properties of multiphase systems as a function of its

microstructure. Electromechanics of particles are also studied. Prerequisite: Graduate Student Standing. (F;S)  
3.000 Credit hours

**MEEN 835 - Physicochemical Hydrodynamics**

This course deals with advanced principles of physicochemical hydrodynamics with special emphasis on topics relevant to microfluidics. The topics covered include viscous flow coupled with molecular diffusion and Brownian motion, electrokinetic phenomena and its applications in electrophoretic separation and colloidal suspension, surface tension and its effects on microstructure wetting and electrohydrodynamic flows. Prerequisite: Graduate Standing. (F;S)  
3.000 Credit hours

**MEEN 845 - Feedback Control of Mechan Sys**

This course covers theory and application of linear systems and feedback control. Topics include: spaces and linear operators, eigenvalues and eigenvectors, state equations, transfer functions, controllability, observability, realizations, decomposition, stability of mechanical systems including robotics and machine tool vibrations. This course will also cover control design concepts for linear multivariable systems, pole placement and observer design. Prerequisite: Graduate Standing. (F;S)  
3.000 Credit hours

**MEEN 847 - Computational Engi Dynamics**

This course introduces computer-oriented methods for the analysis and design of engineering dynamic systems. Topics include: analytical and experimental techniques for model development, design refinement of components in flexible dynamics systems (machine tools, robots,

moving vehicles, etc), and optimization techniques for transient response analysis on both constrained and unconstrained systems. Prerequisite: Graduate Standing. (F;S)  
3.000 Credit hours

### **MEEN 852 - Surface and Subsurface Studies**

This course covers thermodynamics of surfaces and subsurfaces, surface energy, surface reconstruction and electronics. Topics include Terrace-Ledge-Kink Model, Kinetic theory and vacuum concepts, UHV hardware, pumping and system designs. In-situ experiments structural, chemical analysis and microscopy, diffraction techniques and scanned probe microscopy are included. Prerequisite: Graduate Standing. (F;S)  
3.000 Credit hours

### **MEEN 854 - Advances in Nanomaterials**

This course deals with the structural, mechanical and physical properties of nanostructured materials as well as their relevant functions. The course presents a variety of fabrication techniques for nanostructures, related transport phenomena and kinetics at the nanoscale. Prerequisite: Graduate Standing. (F;S)  
3.000 Credit hours

### **MEEN 860 - Fracture Mechanics**

This course introduces the student to the concept of stress and strain singularities and their effect on fracture strength and fatigue life of isotropic and anisotropic materials. Topics covered include: computation of the stress-strained field around a crack-tip, stress-intensity-factor, strain energy release rate, J-integral, fracture toughness, residual strength, and fatigue crack propagation life. The course concepts are applied to the design of damage tolerant structures. Prerequisite: Graduate Standing. (F;S)  
3.000 Credit hours

### **MEEN 885 - Special Topics**

This course is designed to allow the introduction of potential new courses on a trail basis or special content courses on a once only basis at the doctorate level. The topic of the course and the title are determined prior to registration. Prerequisite: Consent of instructor.  
3.000 Credit hours

### **MEEN 992 - Doctoral Seminar**

In this course, doctoral students attend colloquia or seminars. They consist of presentations by doctoral students on dissertation topics and work-in-progress and by guest on important classical, contemporary, or research problems in mechanical engineering. Prerequisite: Doctoral level standing.  
1.000 Credit hours

### **MEEN 993 - Doctoral Supervised Teaching**

This course is designed to introduce the doctoral student to classroom or laboratory teaching under the supervision of a faculty mentor. Doctoral students who serve as teaching assistants or as instructors are required to take this course during first semester they teach. Others planning to undertake a teaching career are also strongly encouraged to take it. Topics covered include: course planning, classroom teaching, lecture preparation, student evaluation, and grading. The supervisor(s) will observe and provide feedback to the student and evaluate the student's performance. Prerequisite: Doctoral level standing.  
3.000 Credit hours

### **MEEN 994 - Doctoral Supervised Research**

This is supervised research under the mentorship of a member of the graduate

faculty. It is not intended to serve as the dissertation topic of the doctoral student. Prerequisite: Consent of instructor. Note: May be repeated for credit.  
3.000 Credit hours

### **MEEN 997 - Doctoral Dissertation**

This supervised research serves as the dissertation of the doctoral student. Twelve credits of dissertation are required for graduation. Prerequisite: MEEN 995. (F;S;SS) Note: May be repeated for credit.  
3.000 Credit hours

### **MEEN 999 - Continuation of Dissertation**

This is a continuation of the doctoral dissertation research. This course is only available to students who have completed 12 credit hours of dissertation work. Prerequisite: MEEN 997. (F;S;SS) Note: May be repeated for credit.  
1.000 Credit hours

## **MGMT Management**

### **MGMT 605 - Methods in Business Analysis**

This course focuses on building an understanding of mathematical analysis techniques necessary to solve complex business problems from a wide range of business areas, including inventory, customer service, sales and quality management. Basic statistical concepts and statistical process improvement are covered. Students will use a variety of computer software packagings including Microsoft Excel and SPSS. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **MGMT 612 - Foundation of Enter Management**

This course provides an understanding of key themes related to successful enterprise management and discussions of the

interpersonal and intellectual skills necessary to contribute to a highly competitive and globalized business environment. Topics include the globalization of commerce, marketing and market systems, competitive strategy, perspectives on legal and ethical business conduct, information technology and the elements of quality. Individual and team competencies are developed using materials that involve interpersonal skills, problem-solving and case analysis. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **MGMT 699 - Spe Topics in Human Resources**

This course will address selected topics in Human Resources Management (HRM) Examples include onsite assessment of HRM issues, strategies and policies; current trends in funding employee medical and retirement benefits; collective bargaining strategies for global enterprises; industry comparisons of critical success factors for HRM; and advance technologies for employee training and development. This course may also include an international experience (study abroad) when offered in the summer. Prerequisites: MGMT 730, MGMT 522 or permission of the instructor. (F;S)  
3.000 Credit hours

### **MGMT 718 - Management and Organi Analysis**

This course is a study of formal organizations as rational, organic, open systems and their behavior in response to an ever-changing , global and domestic environment. It covers macro and micro theories of management and organizations and their application to organizational design and processes. Organizational effectiveness, strategic planning and control structural designs, leadership, motivation,

globalization, and corporate politics and culture and studied through extensive reading, case studies, exploratory research and seminar discussions. Prerequisites: ACCT 708, BUAD 705, BUAD 712 and ECON 706. (F;S)  
3.000 Credit hours

### **MGMT 720 - Management and Organizational Behavior**

This course covers both macro and micro theories of management and organizations. This will include the study of formal organizations as rational, organic, open systems; their behavior in response to an ever-changing, global and domestic environment; and the behavior of the employees employed by them. Organizational effectiveness, structural designs, leadership, motivation, globalization, and corporate politics and culture are studied through extensive reading, case studies, exploratory research, and seminar discussions. Prerequisites: MGMT 612 or Permission of Instructor. (F;S;SS)  
3.000 Credit hours

### **MGMT 725 - Business Analytics**

This course will cover the basic descriptive, predictive, and prescriptive analytical techniques for decision making in all business functions. Topics covered will include constructing and analyzing data distributions, decision theory and analysis, statistical sampling and confidence estimation, business forecasting, linear and multiple regression models, linear and integer mathematical programming, and computer simulation. Students will utilize statistical and mathematical programming software throughout the course to solve complex managerial problems and interpret results. Prerequisites: MGMT 605 or Permission of Instructor. (F;S;SS)

3.000 Credit hours

### **MGMT 727 - Operations Management**

This course is designed to provide a solid foundation and deeper understanding of how the operations function contributes to ensuring effective and efficient flow of materials and information within and outside the organization. We will take a broad managerial perspective emphasizing the strategic impact of the operational decisions and the interfaces between operations and the other functional areas of the organization. We will look at the operations function in both service and manufacturing contexts and investigate how it provides sustainable competitive advantage along the dimensions of cost, quality, delivery, flexibility and innovation. Prerequisites: MGMT 605 or Permission of Instructor. (F;S;SS)  
3.000 Credit hours

### **MGMT 731 - Staffing Workforce Plan and De**

This course looks at theory and application methods used in the recruitment and selection of employees. Course topics include job analysis, interviewing and testing methods, selection techniques, legal issues in recruitment and selection, internal and external selection processes including performance appraisal and management, staffing philosophies for international operations and expatriate repatriation. Prerequisite: MGMT 605, MGMT 612 or Permission of Instructor. (F;S;SS)  
3.000 Credit hours

### **MGMT 733 - Compensation and Benefits**

This course examines theory and practice in designing and managing compensation and benefits systems in organizations. Issues considered include compensation and benefit systems as vehicles for attracting, motivating and retaining employees;

designing individual and group incentive plans; structuring pension plans; determining wage levels and structures; legal issues and considerations in compensation and benefit administration; and expatriate compensation. Prerequisite: MGMT 605, MGMT 612 or Permission of Instructor. (F;S;SS)  
3.000 Credit hours

### **MGMT 735 - Employee Relations and Develop**

This course examines the policies and practices used (A) to promote equitable treatment of employees and (B) for training and development human resources in organizations. Topics include employee health and safety equal opportunity and affirmative action, workforce diversity, conflict resolution, industrial relations, leadership and career development, change theory, and best practices for international operations are also discussed. Prerequisites: MGMT 720, MGMT 605, MGMT 612 or Permission of Instructor. (F;S;SS)  
3.000 Credit hours

### **MGMT 736 - Human Re Management Strate**

This course focuses on the formulation and implementation of human resources management strategies. Emphasis is placed on the strategic dimensions of recruitment, selection, development and retention of a workforce needed to accomplish organizational strategic objectives. Prerequisites: MGMT 731, MGMT 733, or Permission of Instructor. (F;S;SS)  
3.000 Credit hours

### **MGMT 750 - Corporate Strategy and Policy**

This is an integrative (CAPSTONE) course designed to develop students' ability to think strategically about issues central to creating and sustaining a firm's competitive position.

Because of the ever-changing and increasingly complex business environment, it emphasizes both the dynamics and global aspects of strategic management. Topics include the strategic role of the general manager, crafting corporate and business-level strategy, managing strategic change, strategy implementation, and control. Others are building a firm's capability to sustain competitive advantage, analyzing industry evolution, global rivalry and ethical reasoning that underlie strategic competitive decisions. Course objectives are accomplished through extensive case analysis from a variety of industries and managerial settings to give students opportunity to apply strategic management skills and tools. Prerequisites: MGMT 720, ACCT 763, FIN 750, MGMT 727, ECON 708, MGMT 725, MKTG 716. (F;S;SS)  
3.000 Credit hours

### **MGMT 785 - Practicum or Internship**

This course will provide the student an opportunity for experiential learning in management. Students working in an approved position that allows them to participate in activities which give them a comprehensive understanding about management will be allowed to structure their work experience as an internship, social entrepreneurship, non-profit international experience. Prerequisites: MGMT 720, ACCT 763, FIN 750, MGMT 727, ECON 708, MGMT 725, MKTG 716, MGMT 750. (F;S;SS)  
1.000 TO 9.000 Credit hours

## **MIS Management**

### **MIS 713 - Manage Imple Enter Infor Sys**

This is an applied course in information systems concepts and techniques used in today's competitive environment. Topics will include the concepts of enterprise information systems, use of information

systems to achieve strategic goals and to gain competitive advantages, the impacts of information systems on business process reengineering and management, managerial issues in developing information systems. IS project management, and other contemporary IS technologies. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **MIS 719 - Enterprise Sys Anal and Design**

This course takes a systematic approach to discuss the design of an enterprise information system for a business firm or inter-organizational supply chain. Enterprise analysis and design methodology is used to demonstrate the principles, models, and tools needed to design enterprise systems. Students will apply the enterprise system design methodology to perform business process analysis, design of information and functional requirements, and implementation of an actual enterprise resource planning project. Prerequisite: MIS 713. (F;S;SS)  
3.000 Credit hours

## **MKTG Marketing, Transportation & Supply Chain**

### **MKTG 716 - Strategic Marketing**

This course provides a comprehensive view of strategic marketing decision-making. Students gain a deeper understanding of a customer orientation, competitor analysis, environmental scanning, and the role of marketing in an organization. Students are exposed to the marketing tools and processes used by managers including marketing research, data analytics, customer service and value analysis, brand equity and product management, integrated marketing communications, pricing strategies, salesforce effectiveness, and distribution

strategies. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

## **MSA Administration & Instructional Service**

### **MSA 770 - Research for School Adminis**

This course will examine the quantitative and qualitative research methodologies appropriate to school settings and the evaluation of research, data analysis, and its application to schools. (F;S;SS)  
3.000 Credit hours

### **MSA 771 - Diversity Is Com Re School Ex**

This course will focus on the skills school Executives need to build professional learning communities. School leaders must address the needs of diverse student populations. Candidate will develop a greater awareness of diverse school culture that is rooted in the community which he/she serves. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **MSA 774 - Curriculum Leader and Assess**

This course will focus on the application of current theories of learning and psychological research in educational leadership of classroom instruction. This course is designed to study practices of applied curriculum leadership, curriculum planning, curriculum design and trend analysis. Instructional models to improve instruction and student achievement will be examined. (F;S;SS)  
3.000 Credit hours

### **MSA 776 - Educa Law Policy and Politics**

This course will cover the influence of the laws, educational policies, and power structures of communities on the goals and operations of schools. Examining state statues, administrative policies, and regulations as court decisions regarding



public school personnel functions is essential for school administrators. Legal and ethical issues relative to equity, quality, gender, ethnicity and appropriate application of legal principles are also discussed.

(F;S;SS)

3.000 Credit hours

### **MSA 778 - The School Principalship**

The principalship course will examine different management perspectives of school operations, organization, team leadership, school-based collaboration, business management, public school, finance, and school-based budgets. The way school districts operate, district level decision making, and elements of school quality that impact on operating programs, and the relationship of schools to other community agencies will be discussed. (F;S;SS)

3.000 Credit hours

### **MSA 784 - School Finance**

This course explores how school administrators can allocate limited resources to achieve prioritized goals and objectives. Emphasis is placed on both the understanding of the methods of financing public schools, as well as the basic overview of budgeting and evaluation principles that are needed to ensure that resources are allocated with optimum efficiency and effectiveness. Candidates explore the primary revenue sources for Pre-K-12 education and the mechanism for distributing revenues to individual school districts at the state and local level.

Prerequisite: None. (F;S;SS)

3.000 Credit hours

## **MSAL Administration & Instructional Service**

### **MSAL 784 - Internship Supervision I**

Internship Supervision I is the initial level of the internship experience. The internship

provides an opportunity for skill development in key leadership areas. Each student will complete an internship in a school setting with joint supervision by a university faculty member and a cooperating principal mentor for each individual intern. Internship Supervision I is the first half of a year-long (ten month) clinical experience that is taken by permission of the advisor/program coordinator only. The internship supervision course is capped at six students. Prerequisite: MSA 778, MSA 771, MSA 770, MSA 774. (F;S;SS)

6.000 Credit hours

### **MSAL 785 - Internship Supervision II**

Internship Supervision II is the advanced level of the internship. Students will complete their action research projects and North Carolina Department of Public Instruction requirements for licensure certification. Each student will complete the internship in a school setting to put into action leadership skills mastered in Internship Supervision I. Internship Supervision II is the second half of a year-term (ten month) clinical experience that is taken by permission of the advisor/program coordinator only. The internship supervision course is capped at six students.

Prerequisite: MSAL 784 Internship Supervision I. (F;S;SS)

1.000 TO 20.000 Credit hours

### **MSAL 789 - Internship Seminar I**

The Administrative Internship Seminar is the culminating experience in the MSA Program. The central purpose of the Internship is to offer interns opportunities to develop and document their achievements and mastery of the performance standards necessary for effective school leadership. Designed to facilitate the application of knowledge and the development of leadership skills, the internship provides intentionally planned and supervised "real

world" opportunities for aspiring administrators to impact learning for all students. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **MSAL 792 - Internship Seminar II**

The internship seminar is conducted once a week during the full-time internship. This seminar complements field activities and provides interns the opportunity to share experiences, develop concepts, and broaden their knowledge of school administration. Students will develop case studies, and portfolios to demonstrate acquisition of skills. Prerequisites: MSAL 789 Internship Seminar I, MSA 780 (Internship Seminar I) and Co-requisite: MSA 783 (Internship Supervision II). (F;S;SS)  
3.000 Credit hours

## **MSTM Applied Engineering Technology**

### **MSTM 701 - Strate Manage of Tech and Inno**

This course will provide a critical review and analysis of current and emerging trends in managing technological innovations. It will emphasize the role of technology as a strategic means of achieving an organizational objectives. Topics of discussion will include, but not limited to technological innovation process, technological strategies, technological forecasting and assessment, management of research and development, managing new ventures and entrepreneurship. Prerequisites: Graduate Standing. (F;S;SS)  
3.000 Credit hours

### **MSTM 702 - Enterprise Resource Plan Sys**

This course introduces information-based management systems, which provide a seamless integration of all the information flow through an enterprise. Topics covered

include: financial and accounting information, human resource information, product planning, materials planning and purchasing, maintaining inventory, supply chain management, tracking orders, and customer network. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **MSTM 703 - Statis and Prob in Tech Manage**

This course introduces the concepts and methods of statistics and probability applications in industrial technology. Topics include descriptive statistics, probability theory, sampling distribution, probability distributions, linear and multiple regressions, auto- and cross-correlation, and confidence intervals. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **MSTM 704 - Research Meth for Tech Manage**

This course will introduce students to the various methodologies of conducting empirical research. Topics covered include: problem identification, hypothesis testing, research design, data collection and analysis, reporting of research findings, and research proposal development. Prerequisites: MSTM 703, or ITT 702 or consent of instructor. (F;S;SS)  
3.000 Credit hours

### **MSTM 784 - Internship**

This course is designed to provide students with an internship experience in an industrial environment related to their technical discipline. Students must be employed full-time for one semester. Evaluation will be based on reports from the student's industrial supervisor and the university coordinator. Prerequisite: 15 hours graduate credits. (F;S;SS)

3.000 Credit hours

### **MSTM 792 - Master's Thesis II**

The students enroll in this course to complete approved research for the thesis.

Prerequisite: MSTM 791. (F;S)

3.000 Credit hours

### **MSTM 796 - Master's Degree Project**

The master's degree project is designed to be a culminating experience for the master's degree. It is applications oriented and focuses on an actual project related to the student's technical discipline. The course is intended to integrate the learning from the classes taken in the degree program.

Prerequisite: 24 credit hours of graduate level courses. (F;S;SS)

3.000 Credit hours

### **MSTM 797 - Master's Thesis**

The student will select a research topic that is of special interest and approved by his/her graduate thesis advisor. The research must culminate into a well-written thesis.

Prerequisites: MSTM 704 or consent of advisor. (F;S;SS)

1.000 TO 6.000 Credit hours

## **MUSI Visual & Performing Arts**

### **MUSI 620 - Advanced Music Appreciation**

Analytic studies of larger forms from all branches of music writing will be included. Special emphasis on style and structural procedures by principal composer; works taken from all periods in music history. Designed for students with previous study of music appreciation. (DEMAND)

3.000 Credit hours

## **NANO Nanoengineering**

### **NANO 701 - Sim Model Meth Nanosci Nanoen**

This course covers first principles quantum based methods, classical atomistic simulation methods interatomic potentials, modeling of bulk nanostructure metals, carbon nanotubes, soft matter and multiscale modeling techniques. Prerequisite: Consent of the instructor. (F;S)

3.000 Credit hours

### **NANO 702 - Funda of Nanoengi Phys Princi**

This course is an introduction to physical principles involved at the nanoscale due to quantum size effects, and energy band structure engineering for nanoelectronic devices. Prerequisite: Consent of the instructor. (F;S)

3.000 Credit hours

### **NANO 703 - Fun Nanoengi Chem Biochem Pri**

This course covers chemical and biochemical principles involved in design, synthesis, assembly, and performance of nanomaterials and devices. Also studied are the structure and function of biomolecules and their specific roles in nano-biomolecular interactions and signalling pathways. As well as application of chemical biological detection methods at the micro and nano scales. Prerequisite: Consent of the instructor. (F;S)

3.000 Credit hours

### **NANO 704 - Fundamentals of Nanomaterials**

This course covers fundamental theory and concepts of nanomaterials including carbon nanotubes, nanostructured metal/ceramic/composites materials, nanowires, quantum dots, bio-related nanomaterials, nanoparticles, nanoclays, and magnetic nanomaterials. prerequisite:

Consent of the instructor. (F;S)  
3.000 Credit hours

### **NANO 705 - Nano Safety**

This is an interdisciplinary course that explores the safety, environmental, and ethical issues surrounding the manufacture, distribution, use, and disposal of nanomaterials. Students will read and discuss the established principles of nano safety along with new material as it arises from the primary literature. The pedagogy utilized in this course fosters student critical thinking about the interaction of nanomaterials with the biological world. Prerequisites: Graduate Standing. (F;S)  
3.000 Credit hours

### **NANO 711 - Introduction to Nanoprocessing**

This course introduces students to the field of nanoprocessing including basic fabrication and processing techniques to construct nanostructures and nanomaterials through both "bottom up" and "top down" strategies. Basic nanostructure characterization techniques are integrated as a start. Prerequisite: None. (F;S)  
3.000 Credit hours

### **NANO 721 - Nanobioelectronics**

This course introduces the emerging areas where biology, medicine, nanofabrication and electronics coverage. The course addresses fundamental concepts and current applications of biofabrication and bioelectronic devices such as biosensors, DNA electronics, protein based devices, analytical electrochemistry, biomolecular electronics, single molecule physics, BioNano machines, and biofuel cells. A special emphasis is placed on problem-based learning targeting current issues in nanobioelectronics. Prerequisites: NANO 702 or NANO 703 or consent of instructor. (F;S)

3.000 Credit hours

### **NANO 731 - Intro to Nanomodeling and Appl**

This graduate level course provides an introduction to nanomodeling and applications for students with background in engineering, physical, mathematical, and biological sciences focusing on atomistic and molecular dynamics modeling. Prerequisites: NANO 701 or consent of instructor. (F;S)  
3.000 Credit hours

### **NANO 741 - Colloidal and Molec Self-Assem**

This course offers an introduction to self-assembly in soft matter and the associated thermodynamic and chemical principles. Topics are covered from a materials-oriented perspective and include colloidal crystals, liquid crystals, surfactants and micelles, polymers and block copolymers, and biomolecule assembly. Prerequisite: None. (F;S)  
3.000 Credit hours

### **NANO 761 - Introduction to Nano Energy**

This course is a comprehensive course on nanomaterials and devices for energy applications that will introduce principles of energy storage and harvesting methods. Course will cover basic energy principles, nano architecture of energy materials and its devices for energy storage, harvesting, and conversion. Prerequisites: Graduate Standing. (F;S)  
3.000 Credit hours

### **NANO 792 - Graduate Seminar**

Discussions and reports of subjects in Nanoengineering and allied fields will be presented. Prerequisite: Master's level standing. (F;S)  
1.000 Credit hours

**NANO 794 - Masters Supervised Research**

This course is supervised research under the mentorship of a faculty member. It is not intended to serve as the project nor thesis topic of the master's student. Prerequisite: Master's level standing. (F;S;SS)  
3.000 Credit hours

**NANO 796 - Master's Project**

The student will conduct advanced research of interest to the student and the instructor. A written proposal, which outlines the nature of the project must be submitted for approval. This course is only available to project option students. Prerequisite: Master's level standing with project option. (F;S;SS)  
3.000 Credit hours

**NANO 797 - Master's Thesis**

Master of Science thesis research will be conducted under the supervision of the thesis committee chairperson leading to the completion of the Master's thesis. This course is available only to thesis option students and can be repeated. Prerequisite: Master's level standing with thesis option. (F;S;SS) Note: May be repeated for credit.  
3.000 Credit hours

**NANO 799 - Continua of Master's Thesis**

This is a continuation of NANO 797. This course is for master's students who have completed all required credit hour requirements. Prerequisite: Completion of all Thesis Credits. (F;S;SS) Note: May be repeated for credit.  
1.000 Credit hours

**NANO 811 - Polymeric Materials Engineer**

This course introduces polymer fundamentals, synthesis, structure and properties, and processing with an emphasis on applying basic knowledge in

nanoengineering applications. Prerequisite: None. (F;S)  
3.000 Credit hours

**NANO 812 - Process Modeling in Composites**

This course provides an overview of composites, composite manufacturing processes followed by transport equations, constitutive laws and their characterization in composite processing. Process modeling applications to specific composite manufacturing processes involving short fibers, continuous and woven fibers for processing with thermoplastic and reactive thermoset resin systems are discussed. Transport issues in the processing of polymer nanocomposites are briefly discussed. Prerequisites: NANO 701 or consent of instructor. (F;S)  
3.000 Credit hours

**NANO 821 - Advanced Nanosystems**

This course is designed to teach advanced nanosystems, which are a result of hierarchical assembly and integration of diverse and heterogeneous components including materials, molecules and components at the nanoscale. This course discusses the fundamental concepts and current trends in such advanced nanosystems with examples from nanoelectronic/photonic devices, organic-inorganic assemblies, biomimetic devices, bio-nano machines, biofuel cells etc. A special emphasis is placed on problem-based learning targeting current issues in nanosystem integration. Prerequisites: NANO 721 or consent of instructor. (F;S)  
3.000 Credit hours

**NANO 825 - Thin Film Tech for Device Fabr**

The course provides a fundamental understanding of the thin film deposition techniques and epitaxial growth of

semiconductor materials. High vacuum technology and application of the deposition processes to the fabrication of heterostructure devices are also covered. Prerequisites: NANO 702 or consent of instructor. (F;S)  
3.000 Credit hours

#### **NANO 827 - Solid State Devices**

This course deals with p-n junction and Schottky barrier diodes, bipolar junction, and field effect transistors, heterostructure devices (e.g. heterojunction bipolar transistors and solar cells), device modeling and simulation. Prerequisites: NANO 702 or consent of instructor. (S)  
3.000 Credit hours

#### **NANO 841 - Intermolecular and Surface Forces**

This course covers the theory and principles of forces between molecules, particles, and surfaces typically relevant at micrometer and nanometer length scales. Topics include; detailed treatment of dispersion, polar, and electrostatic interactions; solvation, hydration and steric forces; adhesion and surface tension; and relevance to real material systems. Prerequisite: None. basic courses in thermodynamics recommended. (F;S)  
3.000 Credit hours

#### **NANO 851 - Computational Nano Model Lab**

This is a laboratory rotation course to expose and educate the students on computational modeling analysis, and enabling technologies available for nanoscale modeling. Prerequisites: Student in Nanoengineering/Nanoscience Ph.D. program. (F;S)  
1.000 Credit hours

#### **NANO 853 - Nano-Bio Electronics Lab**

This is a laboratory rotation course to expose and educate the students on the equipment and tools available in the nano-bio electronics laboratory. Prerequisites: Student in Nanoengineering/Nanoscience Ph.D. Program. (F;S)  
1.000 Credit hours

#### **NANO 854 - Nanomaterials Laboratory**

This is a laboratory rotation course to expose and educate the students on the equipment and tools available in the nanomaterials laboratory. Prerequisites: Student in Nanoengineering/Nanoscience Ph.D. program. (F;S)  
1.000 Credit hours

#### **NANO 855 - Nano Energy Laboratory**

Note: May be repeated for credit.  
1.000 Credit hours

#### **NANO 861 - Advanced Nano Energy Systems**

This graduate level course is an advanced level treatment of materials and devices for energy storage. Course will cover principles of battery and capacitor science, nanoscale materials, 2D to 3D processor development for energy devices. Discussions will also include current nanotechnology aspects of energy storage. Prerequisites: NANO 761 or consent of instructor. (F;S)  
3.000 Credit hours

#### **NANO 991 - Doctoral Qualifying Exam**

This supervised program is for students who are taking the Nanoengineering Ph.D. qualifying examination as required for the Ph.D. program of study. It culminates in a scheduled written examination administered on a Pass/Fail basis and must be passed after the completion of the first year of Ph.D. course work on an unconditional basis. Prerequisites: Doctoral student in Nanoengineering with unconditional admission status and consent of academic

advisor. (F;S)  
3.000 Credit hours

### **NANO 992 - Doctoral Seminar**

Seminars delivered by invited speakers, researchers, faculty and students. Participation in these seminars will count for 2 credit hours (1 credit hour for each academic year). The student receives a Pass/Fail and no letter grade is given upon completion. Prerequisites: Student in Nanoengineering/Nanoscience Ph.D. program. (F;S) Note: May be repeated for credit.

1.000 TO 2.000 Credit hours

### **NANO 993 - Doctoral Supervised Teaching**

This course introduces the doctoral student to classroom or laboratory teaching under the supervision of a faculty mentor. The student receives a Pass/Fail and no letter grade is given upon completion. Prerequisite: Doctoral standing. (F;S)  
3.000 Credit hours

### **NANO 994 - Doctoral Supervised Research**

This is supervised research under the mentorship of a member of the graduate faculty. It is not intended to serve as the dissertation topic of the doctoral student. The student receives a Pass/Fail and no letter grade is given upon completion. Prerequisite: Doctoral standing. (F;S)  
3.000 Credit hours

### **NANO 995 - Doctoral Preliminary Exam**

This is required for students who have completed the nanoengineering doctoral qualifying examination and who are taking the preliminary examination (oral preliminary defense). The student receives a Pass/Fail and no letter grade is given upon completion. Prerequisite: Student in Nanoengineering Ph.D. program. (F;S;SS)

3.000 Credit hours

### **NANO 997 - Doctoral Dissertation**

This represents the supervised research leading to the dissertation for the doctoral student. The student receives a Pass/Fail grade only after the completion of the final Ph.D. oral defense. Prerequisite: Doctoral standing in nanoengineering. (F;S;SS) Note: May be repeated for credit.

3.000 Credit hours

### **NANO 999 - Continuation of Dissertation**

This course is for doctoral students who have completed all required dissertation credit hours. This can be repeated by the students as required. The student receives a Pass/Fail and no letter grade given upon completion. Prerequisite: Completion of all dissertation credits in nanoengineering. (F;S;SS) Note: May be repeated for credit.  
1.000 Credit hours

## **NARS Natural Resource & Environmental Design**

### **NARS 601 - Plant Pathol Plant Disease Con**

Fundamental principles of plant pathology, including disease etiology, symptomatology, epidemiology of representative of different crop and tree diseases will be covered. Modern and biotechnology approaches to disease identification and control will be covered. Prerequisite: None. (F;S;SS)  
3.000 Credit hours

### **NARS 604 - Crop Ecology**

This course is the study of the physical environment and its influence on crops; geographical distribution of crops.  
3.000 Credit hours

### **NARS 685 - Special Topics**

In this course, specific need areas will be taught as case scenarios involving literature

searches, hands-on activities and lectures, as needed. Students will acquire specialized knowledge and learn new skills and terminology used in the specific case scenarios and conduct critical evaluations leading to reports and/or juried presentations. Prerequisites: Graduate of Senior Standing. (F;S;SS)  
3.000 Credit hours

### **NARS 789 - Grad Semi in Natural Resources**

This course teaches the fundamentals of proposal writing, thesis preparation; it prepares students to make scientific presentations and publish their research findings in scientific journals. Prerequisites: Graduate Standing. (F;S)  
1.000 Credit hours

### **NARS 796 - Master's Project**

The student will conduct advanced research of interest to the student and the instructor. A written proposal, which outlines the nature of the project, must be submitted for approval. This course is only available to project option students. Prerequisite: Consent of advisor. (F;S;SS)  
3.000 Credit hours

### **NARS 797 - Master's Thesis Research**

Master of Science thesis research under the supervision of the thesis committee chairperson, leading to the completion of the Master's thesis. This course is only available to thesis option students. Prerequisite: None. (F;S;SS) Note: May be repeated for credit.  
1.000 TO 6.000 Credit hours

### **NARS 799 - Thesis Rsrch Agric Env Sci**

Note: May be repeated for credit.  
1.000 TO 6.000 Credit hours

## **OSH Built Environment**

### **OSH 678 - Experiential Education I**

To satisfy the requirements of this course, students must engage in cooperative activities within industry, government agencies, or consulting firms. Work responsibilities must include significant hazard assessment activities. Conditions of experience are supervised by department faculty. (F;S)  
3.000 Credit hours

### **OSH 679 - Experiential Education II**

To satisfy the requirements of this course, students must engage in intern activities within industry, government agencies, or consulting firms. Work responsibilities must include significant hazard assessment activities. Conditions of experience are supervised by department faculty. (F;S)  
3.000 Credit hours

## **PHYS Physics**

### **PHYS 600 - Classical Mechanics**

This course is a theoretical treatment of particle and rigid body dynamics. Topics included are: variational principles, Lagrangian and Hamiltonian mechanics, the physics of rotation, oscillations, canonical transformations and Hamilton's equations, Hamilton-Jacobi theory. Prerequisites: PHYS 401 or Graduate Standing.  
3.000 Credit hours

### **PHYS 615 - Electromagnetic Theory I**

This course is an advanced study of electromagnetic phenomena which along with Physics 715 covers: electromagnetic properties of matter; propagation, radiation, and absorption of electromagnetic waves; simple radiating systems, special relativity; covariant electrodynamics; radiation by moving charges. Prerequisites: PHYS 416 or Graduate Standing.  
3.000 Credit hours

### **PHYS 620 - Quantum Mechanics I**



This is an advanced study of quantum theory which along with Physics 720 covers the fundamental concepts and formulations: theory of measurement with application to simple physical systems, operator formalism, symmetries and invariance, system of identical particles, angular momentum and the theory of spin, variational and perturbation approximation technique, time-dependent perturbation theory and radiation, scattering theory with applications. Prerequisite: PHYS 421 or Graduate Standing.  
3.000 Credit hours

### **PHYS 630 - Statistical Mechanics**

This course covers fundamentals of classical and quantum statistical mechanics: statistical ensembles and distributions functions, non-interacting particles, ideal Fermi and Bose system, treatment of interacting systems, phase transitions, approaches to collective phenomena. Prerequisite: PHYS 430 of Graduate Standing.  
3.000 Credit hours

### **PHYS 685 - Special Topics**

This course provides studies in physics under staff guidance.  
1.000 TO 3.000 Credit hours

### **PHYS 715 - Electromagnet Theory II**

This course continues the study of electromagnetic phenomena which along with Physics 615 covers: electromagnetic properties of matter; propagation, radiation, and absorption of electromagnetic waves; simple radiating systems; special relativity; covariant electrodynamics; radiation by moving charges. Prerequisite: PHYS 615.  
3.000 Credit hours

### **PHYS 720 - Quantum Mechanics II**

This course continues the study of quantum theory which along with Physics 620 covers: theory of measurement with application to

simple physical systems, operator formalism, symmetries and invariance, system of identical particles, angular momentum and the theory of spin, variational and perturbation approximation technique, time-dependent perturbation theory and radiation, scattering theory with applications. Prerequisite: PHYS 620.  
3.000 Credit hours

### **PHYS 738 - Nuclear Physics**

This course covers descriptions of properties of the nuclear structure: nucleon-nucleon scattering, nuclear scattering theory, phenomenological potential models, the shell model, collective motion, giant resonances, direct and compound relations, few body systems, and heavy ion physics.  
3.000 Credit hours

### **PHYS 770 - Research**

This course is graduate level research in selected areas of physics. Topics may be analytical and/or experimental and encourage independent study. The amount of credit will be determined before the beginning of the course. Note: May be repeated for credit.  
1.000 TO 9.000 Credit hours

### **PHYS 789 - Graduate Seminar**

This course is a survey of current developments in physics. The topics will be selected before the beginning of the course and will be pertinent to the programs of enrolled students. Note: May be repeated for credit.  
1.000 TO 3.000 Credit hours

### **PHYS 796 - Master's Project**

This course involves student participation in research training in geophysical sciences conducted by faculty. It offers structured education and research training activities that guide experiences in geophysical topics, techniques and research projects involving geophysical surveys, physical modeling and

numerical simulation. The course may be repeated to earn a maximum of six credit hours. The course is conducted in a lecture-laboratory format with one hour of lecture and four hours of laboratory per week.

Prerequisite: PHYS 601 or permission of instructor.

1.000 TO 6.000 Credit hours

1.000 TO 6.000 Other hours

### **PHYS 797 - Masters Thesis**

This course involves student participation in research training in geophysical sciences conducted by faculty. It offers structured education and research training activities that guide experiences in geophysical topics, techniques and research projects involving geophysical surveys, physical modeling and numerical simulation. The course may be repeated to earn a maximum of six credit hours. The course is conducted in a lecture-laboratory format with one hour of lecture and four hours of laboratory per week.

Prerequisite: PHYS 601 or permission of instructor.

1.000 TO 6.000 Credit hours

## **READ Administration & Instructional Service**

### **READ 735 - Organi and Super of Liter Prog**

This course focuses on administrative acts requisite to the creation and guidance of well-balanced, school-wide literacy programs. It includes managing and implementing Reading /Language Arts program in the classrooms. The course is for all school personnel who are in a position to make administrative decisions regarding the school literacy program. It incorporates teacher inquiry and presentation of research from participatory action research.

Prerequisites: None. (F;S;SS)

3.000 Credit hours

### **READ 736 - Language and Erly Literacy Dev**

The course addresses theories on the development of language and literacy of young children. It covers issues relating to instruction as well as the socialization patterns and practices that facilitate learning in young children's. In addition, it offers opportunities for the collection, analysis and interpretations of data from inquiry and participatory action research in the home and schools of early learners.

3.000 Credit hours

### **READ 738 - Lit for the English Lan Learn**

This course examines theories, research, and empirical-based practices used in effective reading instruction with English Language Learners. Prerequisite: None. (F;S;SS)

3.000 Credit hours

### **READ 755 - Foundations Of Literacy**

This course focuses on the broad field of reading-its goal and nature; its theories; factors affecting its growth; sequential development of skills, attitudes and interests; types of reading approaches; organization and materials in teaching the fundamentals of reading. It incorporates teacher inquiry into appropriate literacy instruction and provides opportunities for classroom participatory action research.

Prerequisites: None. (F;S;SS)

3.000 Credit hours

### **READ 757 - Literacy Assessment and Instru**

This course addresses assessment and intervention procedures of literacy problems. It offers opportunities for candidates to explore and analyze literacy research data that report on best practices and findings, relevant to struggling readers. It covers techniques and materials

candidates can utilize in assessment and

instruction of reading in the classroom and clinical settings. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

### **READ 774 - Research in Literacy Instruc**

This course focuses on the evaluation of recent research concerning findings, approaches, innovations and organizations of literacy instruction. It includes selected topics for reports and research projects. It provides the forum for candidates' presentations of research projects from, inquiry, experimentation, and participatory action research. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

## **SCMG Marketing, Transportation & Supply Chain**

### **SCMG 701 - Strategic Logistics Management**

This course covers the management of all supply chain activities while addressing real-world concerns related to domestic and global demand driven supply chains. This comprehensive approach encompasses the processes associated with the production of goods and services and the movement of raw materials, inventory, and finished goods from the point of origin to the point of consumption. The course addresses supplier management, global operations and decision making, demand and inventory management, distribution and logistics, customer relationship management, and performance measurement and analysis. The course also covers recent development in supply chain improvement methodologies as well as brings together Lean tools and techniques required to eliminate supply chain logistics issues. At the conclusion of the course, a student will have the necessary

tools and metrics required to evaluate a current supply chain and recommend improvements to enhance efficiency and effectiveness. Prerequisites: None. (F;S)  
3.000 Credit hours

### **SCMG 720 - Global Sup Chain Design Manage**

This course is a comprehensive study of the concepts, processes, and models used in the design, development, analysis, and management of global supply chains. Specific topics include global procurement and sourcing, demand forecasting, facilities location, sales and operations planning, transportation decisions, distribution planning, inventory management, and logistics systems design. This course teaches students to identify, analyze, and solve problems in global supply chain management. Software will be used extensively to model logistics and supply chain applications. Prerequisites: SCMG 701. (F;S)  
3.000 Credit hours

### **SCMG 727 - Supply Chain Sys Integration**

This course provides a comprehensive application of Enterprise Resource Planning (ERP) to the functions of Supply Chain Management. An ERP application software will be used for students to evaluate the benefits of ERP implementation and application to supply chain operational efficiency. A strategic alignment of Sales and Distribution (SD), Materials Management (MM), Production Planning (PP), Financial Accounting (FI) and Controlling (CO) is essential to supply chain operations. Students will study the major types of supply chain strategies and how to design and manage the most effective supply configurations and interrelationships to develop and maintain competitive advantage. Prerequisites: SCMG 701. (F;S)

3.000 Credit hours

## SLSC Natural Resource & Environmental Design

### **SLSC 633 - Soil Genesis Classif Land Use**

Factors and processes of soil formation, grouping of soils based on their properties, soil mapping, soil interpretations for various uses and discussion of new concepts in soil taxonomy will be studied. Prerequisite: SLSC 338 or consent of instructor. (F) 0.000 OR 4.000 Credit hours

### **SLSC 640 - Wetland Management**

Designed to provide a basic understanding of the benefits that wetlands in their natural conditions offer mankind, Fish and wildlife habitat, water quality improvement, flood protection, filter traps for pollutants, erosion control, natural products, recreation, and aesthetics. Primary instructional areas will include ecology, wetland systems of the southeast region, wetland law and regulations, soil conditions of wetlands, hydrology of wetlands, methodology of delineating wetlands, wetland irrigation, plant and vegetation identification, and writing environmental reports. 3.000 Credit hours

## SOSW Social Work & Sociology

### **SOSW 600 - Seminar in Social Planning**

Personal and social values as related to social planning: "systems" theories program planning and evaluation are studied. Prerequisite: Senior or graduate standing. 3.000 Credit hours

### **SOSW 601 - Seminar in Urban Studies**

An analysis of the nature and problems of cities, urban development will be included.

(DEMAND)

3.000 Credit hours

### **SOSW 670 - Law and Society**

This course examines selected and representative forms of social justice and injustices; and barriers to and opportunities for legal redress, as related to contemporary issues. Prerequisite: Senior or graduate standing. (F;S;SS) 3.000 Credit hours

### **SOWK 609 - Family Theory and Intervention**

This first year course prepares students for advanced study in clinical social work practice with families. The purpose of this course is to better prepare students for the current and future professional social work job market and to enhance the quality of clinical social work services they will be able to provide. Prerequisite: SOWK 622. (F) 3.000 Credit hours

### **SOWK 618 - Social Work and Social Justice**

This course will teach knowledge and skills students need for social justice work, including advocacy and community organization, within the scope of multicultural clinical practice. The purpose of this course is to better prepare students for the current and future professional social work job market and to enhance the quality of social work services they will be able to provide. Prerequisite: None. (S;SS) 3.000 Credit hours

### **SOWK 619 - Founda of Clini So Work Prac**

This course will teach knowledge and skills students need for social justice work, including advocacy and community organization, within the scope of multicultural clinical practice. Prerequisite:

SOWK 621. (S)  
3.000 Credit hours

**SOWK 621 - Foundations of Social Work Pol**

Explores the history and development of social welfare institutions and social work. Examines the relationships between social problems, social policies, and social work practice from historical and contemporary perspectives. Prerequisite: None. (F;SS)  
3.000 Credit hours

**SOWK 622 - Social Work with Individuals**

Defines and describes direct social work practice; knowledge, skills and values necessary to provide a wide scope of developmental, preventive and therapeutic services to individuals and families. Prerequisite: None. (F)  
3.000 Credit hours

**SOWK 623 - Social Work with Groups**

Advanced course designed to teach group process and strategies, techniques, and skills for working with groups such as support groups and task groups in human services settings. Prerequisite: None. (F;S)  
3.000 Credit hours

**SOWK 624 - Social Work with Prac Human Di**

Examines cultural and social diversity; addresses theoretical and practical dimensions of social work practice with oppressed people of color, women, the aged, the sexually diverse, and the physically disabled. Prerequisite: None. (F)  
3.000 Credit hours

**SOWK 626 - Research Methods**

Research methodology as it relates to the professional practice of social work. Examines quantitative and qualitative methods as means for solving social

problems. Prerequisite: None. (S;F)  
3.000 Credit hours

**SOWK 631 - Social Work Indi Fam Theo Prac**

This is a summer bridge course for students in the 1 year program. This course will place emphasis on the practice of social work in assessment and intervention using personality theory, family theory and the family life cycle, and social work theory. Prerequisites: None. (S)  
3.000 Credit hours

**SOWK 632 - Social Work Fam Group Theo Pra**

Theories related to group and family dynamics and functioning and social work assessment and intervention with families and group from a multicultural clinical perspective. Prerequisites: None. (F;S;SS)  
3.000 Credit hours

**SOWK 634 - Research Methods & Data Analy**

Advanced skills in (a) conceptualizing research problems, (b) completing research in the social work domains: needs assessment, program evaluation, and single subject research, and (c) using inferential skills for data analysis. Prerequisite: None. (F)  
3.000 Credit hours

**SOWK 644 - Organi Con of Clin So Work Pra**

This course prepares students for working within organizations as clinical social workers and administrators by focusing on professional and organizational issues associated with clinical practice. The course also examines how to develop clinically-focused organizations to become more culturally responsive to various diverse constituencies. Prerequisite: SOWK 652. (S)

3.000 Credit hours

**SOWK 652 - Advanced Clin So work  
Prac I**

The first of two advanced level courses in clinical social work practice, this course will focus on building competencies in clinical assessment and diagnosis of mental and substance abuse disorders. Prerequisite: Sowk 619. (F)

3.000 Credit hours

**SOWK 653 - Advanced Clin So Work  
Prac II**

The second of two advanced level courses in clinical social work practice, this course will focus on building competencies in clinical assessment and diagnosis of mental and substance abuse disorders, as well as applying culturally responsive clinical interventions. Prerequisite: SOWK 652. (S)

3.000 Credit hours

**SOWK 669 - Small and Lg Group  
Intervent**

Elements and characteristics of small and large group behavior and process will be studied. Prerequisites: Senior or graduate standing; or permission of the instructor. (F;S;SS)

3.000 Credit hours

**SOWK 674 - Evaluation of Social  
Programs**

The main focus is on evaluative research methodology; research designs, measurement of program effectiveness and cost effectiveness analysis. Include case studies of needs assessments, program monitoring and impact measurement in human services. Prerequisites: Social Statistic(S203) and Research Methods (S403).(S)

3.000 Credit hours

**SOWK 706 - Social Policy Welfare Analy  
II**

This course, the second foundation course in social welfare policy, presents social welfare policy analysis as another form of social work practice, with a repertoire of roles, functions, and skills as in other practice concentrations such as interpersonal or planning and management. As a part of this school's professional curriculum, the course will embody the primary value of social justice as it examines policies, current programs and current delivery systems in addressing issues affecting families, mental and health care. Strategies to shape and frame policy at various levels are addressed. 3.000 Credit hours

**SOWK 710 - Soc Work w/ Families I &  
Yth I**

This is the first course in the concentration on Social Work with Families and Youth at Risk. This course will integrate elements of social policy that affect families with the theory, knowledge, and skills necessary to work with diverse family forms at different stages of life. Building on foundation year content regarding the families, this course will prepare students to assess and intervene with families at an advanced level. An ecological systems perspective will be utilized to help students understand the relationships between individuals and their families and between families and the various social systems with which they interact.

3.000 Credit hours

**SOWK 711 - Soc Work w/ Families & Yth  
II**

This is the second course in the concentration sequence on Social Work with Families and Youth at Risk. This course will build on the advanced knowledge and skill gained in the previous course and allows students to apply that knowledge to specific

problems faced by families across the life span. by participating in this problem-focused course, students will have an opportunity to learn more about the types of problems families face in the United States and how to use various interventive models most appropriate to specific types of problems.

3.000 Credit hours

### **SOWK 733 - Independent Study**

This course permits a participant to develop and execute a learning contract with the instructor to analyze a problem in social work or social welfare through supervised study, outside the classroom setting. The problem must be selected from the scholarly literature of social work or social welfare.

The work of the course must be submitted in the form of a written report. Prerequisites: Graduate Standing in Social Work, SOWK 707. (F;S;SS)

3.000 Credit hours

### **SOWK 734 - Clinical Assessment**

This elective course permits skill-building for competency-based assessment and diagnosis using a biopsychosocial social work framework to assess client strengths and disorders. Prerequisites: Graduate Standing in Social Work, SOWK 710 or SOWK 712. (F;S;SS)

3.000 Credit hours

### **SOWK 735 - School Social Work-Ad Practice**

This elective course permits skill-building for social work practice in the schools with emphasis on culturally sensitive student assessment and intervention, and professional standards and accountability.

Prerequisites: Graduate Standing in Social Work, SOWK 710 or SOWK 712. (F;S;SS)

3.000 Credit hours

### **SOWK 784 - Field Education and Seminar I**

Application of theories and concepts to the role of a professional social work practitioner within a field agency. Assists students to integrate theory and classroom knowledge into their agency field practice.

Prerequisite: None. (F;SS)

3.000 Credit hours

### **SOWK 785 - Field Education and Seminar II**

Application of theories and concepts to the role of a professional social work practitioner within a field agency. Assists students to integrate theory and classroom knowledge into their agency field practice.

Prerequisite: SOWK 784. (S;SS)

3.000 Credit hours

### **SOWK 786 - Field Education III**

Application of theories and concepts to the role of a professional social work practitioner within a field agency.

Prerequisite: SOWK 785. (F)

5.000 Credit hours

### **SOWK 787 - Field Education IV**

Application of theories and concepts to the role of a professional social work practitioner within a field agency.

Prerequisite: SOWK 786. (S)

5.000 Credit hours

### **SOWK 789 - Field Seminar III**

Assists student to integrate theory and classroom knowledge into their agency field practice. Includes capstone project.

Prerequisite: None. (F)

1.000 Credit hours

### **SOWK 792 - Field Seminar IV**

Assists student to integrate theory and classroom knowledge into their agency field practice. Includes capstone project.

Prerequisite: None. (S)  
1.000 Credit hours

## **SPED Educator Preparation**

### **SPED 639 - Lit Devl Strat In Stru Readers**

This course focuses on planning and modifying classroom instruction for students experiencing challenges in acquiring basic literacy skills. Assessment of student strengths and weaknesses to guide instructional decision making and use of explicit research-based instructional techniques and implementation of proven comprehensive reading strategies and programs are discussed. (F;S;SS)  
3.000 Credit hours

### **SPED 661 - Introduction to Exceptionality**

This course gives an overview of the characteristics of individuals with disabilities along with discussion of essential trends, issues and theories relating to special education and lifespan development. Educational, multicultural, humanistic, and legal issues are addressed. (F;S;SS)  
3.000 Credit hours

### **SPED 670 - Clinical Practice in Spe Edu**

This field based course serves as partial fulfillment for the Phase I culminating experience. Candidates are required to teach in a supervised setting with learners in K-12 special education environments under the direct supervision of a mentor teacher and university supervisor. A semester long (minimum ten week) clinical experience is required in an approved setting. Prerequisite: SPED 764. (F;S;SS)  
6.000 Credit hours

### **SPED 748 - Special Edu Assess and IEP De**

This course focuses on culturally responsive assessment, IEP development, state required paperwork and interventions for students with special needs and diverse families. (F;S;SS)  
3.000 Credit hours

### **SPED 760 - Teach Stu with Learn Be Prob**

This course is designed to provide evidence-based strategies to improve the academic and behavioral performance of students with disabilities in inclusive settings. A broad range of academic and behavioral approaches will be discussed, including instructional adaptation and modification, effective collaboration, transition planning and non-violent crisis intervention for disruptive and aggressive students. A 30-hour internship in a supervised setting is required. (F;S;SS)  
3.000 Credit hours

### **SPED 763 - Clsrm Behav Manage in Spe Ed**

This course is a survey of relevant proven research and techniques that are applicable for positive behavior support systems in learning environments for children and youth. This course will include functional behavioral assessment and intervention planning necessary to effectively manage classroom behaviors of individuals or groups of students with learning and behavioral disabilities to promote success in the learning environment. (F;S;SS)  
3.000 Credit hours

### **SPED 764 - Meth Cur Pro Stu Ex Learn Need**

This course is designed to promote culturally responsive instruction through linking classroom content to students' lives and community experiences in the design and delivery of lesson plans. An array of evidence based strategies will be



emphasized. A 60-hour internship in a supervised setting is required. Prerequisite: SPED 760. (F;S;SS)

3.000 Credit hours

### **SPED 765 - Collaboration Consult in Educ**

3.000 Credit hours

### **SPED 772 - Current Issue Re Lead Spec Ed**

This capstone course is designed to address current issues and practices informed by research in special education including leadership, collaboration and impact on student learning. Prerequisite: SPED 670. (F;S;SS)

3.000 Credit hours

## **SYEN Engineering**

### **SYEN 605 - Introduction to System Engi**

This course provides a comprehensive overview of systems engineering processes, methods, tools, and environments. Processes include needs analysis, technology assessment, requirements planning, and system design and improvement. Methods are covered to promote life cycle goals of producibility, usability, supportability and disposability. The course surveys systems tools spanning engineering disciplines that include quantitative, qualitative, computational, experimental, and model-based approaches. Prerequisites: Graduate Standing. (S)

3.000 Credit hours

### **SYEN 710 - Interdisciplin Capstone Pro I**

This course prepares students to plan and implement a systems engineering endeavor. The goal is to engage students in team-based organizational efforts, project management, interpersonal and professional skills development activities, and other project-

based preparatory work. Prerequisites: SYEN 605. (SS)  
3.000 Credit hours

### **SYEN 715 - Interdisciplin Capstone Pro II**

This course is designed to provide students with an opportunity to apply the knowledge, skills and abilities gained across the systems engineering curriculum to address a problem using a systems engineering methodology, which includes the examination of processes, methods, tools, and environments. Prerequisites: SYEN 710. (SS) Note: May be repeated for credit.  
3.000 Credit hours

## **TECH Graphic Design Technology**

### **TECH 708 - Impacts of Technology**

This course introduces the students to the pervasive nature of technological innovations and to increase their awareness of both the promises and the uncertainties associated with the use of technology as a creative human enterprise.  
3.000 Credit hours

### **TECH 717 - Special Problems I**

This course is an advanced study in modern technology that deals with recent developments, trends, practices and procedures in industries. Learning activities include individual and group research and experimentation involving selection, design, development, and evaluation of technical reports and instructional materials.  
3.000 Credit hours

### **TECH 718 - Special Problems II**

Individual study related to modern technology including research and experimentation involving selection, design, development, and evaluation of instructional materials will be the focus of this course.

3.000 Credit hours

**TECH 719 - Tech Educa: Design in Construc**

This course examines design processes as applied to construction for the purpose of helping public school teachers prepare to teach those processes to their own students in technological education. Engineering, innovation, and design topics, as related to construction will be studied. This course will help to prepare the teaching candidate for the Praxis II exam. Prerequisite:

Graduate standing. (F;S;SS)

3.000 Credit hours

**TECH 762 - Assessment of Tech Ed Pro Stu**

This course examines standards, criteria, and strategies for evaluating technological education programs and assessing student performance. Students must prepare and pass a review of their North Carolina Department of Public Instruction portfolios as part of the course. Prerequisite: Graduate Standing. (F;S;SS)

3.000 Credit hours

**TECH 770 - Sys Design Train/Dev Industry**

This course covers the strategic design factors of training and development programs. How to develop estimates of return on investment is covered.

3.000 Credit hours

**TSCM Marketing, Transportation & Supply Chain**

**TSCM 730 - Transportation Planning**

This course addresses the transportation planning process and related activities. Topics of special focus are modal classifications, data requirements,

transportation demand analysis, and methods of evaluation (GIS, cost-benefit analysis, internal rate of return, payback period, etc). Others are multiple criteria evaluation method, post-project evaluation, finance, transportation demand management, and issues in intelligent transportation systems. Prerequisites: None. (F;S)

3.000 Credit hours

**WMI Natural Resource & Environmental Design**

**WMI 617 - Environ Ethics & Philosophy**

2.000 Credit hours

**WMI 619 - Environmental Justice**

This lecture class will cover case studies on landfills, air pollution issues, water pollution issues, solid waste disposal, hazardous waste disposal, nuclear waste issues, biological waste issues, ocean dumping, global oil spill and coastal impacts, incineration and climate issues. Prerequisites: Senior Standing and Consent of instructor. (S)

3.000 Credit hours

**WMI 629 - Hazmat Training**

Students are introduced to regulations, toxicology, monitoring, chemistry, site characterization, safety plan, sampling, spill, control and emergency response. Emphasis is placed on 29 CFR 1910.120 OSHA regulations and other applicable standards. Students will receive a 40-hour Hazmat Training Certificate upon completion of this course in addition to a course grade.

Prerequisites: Consent of Instructor. (F;S)

3.000 Credit hours

**WMI 747 - Adv Waste Mgmt Capst Seminar I**

1.000 Credit hours

