

# NDSU

NORTH DAKOTA STATE UNIVERSITY

BULLETIN 2006-2008

North Dakota State University is in an exciting time of transformation, emerging as a model of the contemporary land-grant institution. By emphasizing quality education, outstanding service, and leading-edge research, NDSU is a leader among our peers.

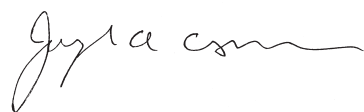
One of our campus themes is "Students are Paramount." It is a phrase that NDSU faculty, staff, alumni, and friends put into action every day. At this university, students are prepared for both life and career through exceptional classroom studies, research opportunities, cultural activities, and social events. Our students work hard, but the challenges of an education at NDSU reap many rewards.

The campus is clearly an institution of choice. NDSU's enrollment stands at more than 12,000 students in our undergraduate and graduate programs. Our annual research expenditures surpass \$100 million. NDSU's new doctoral and master's degree programs have given us the graduate program mix of a national land-grant university, and our graduate enrollment now surpasses 1,600 students. Bison student athletes successfully compete in the ranks of NCAA Division I.

Our visitors marvel at the sense of enthusiasm that they see on the NDSU campus. It's clear to me that people from around the country are looking at our state and our university in a different and very positive way.

NDSU's mission statement says much about who we are. It reads: "With energy and momentum, North Dakota State University addresses the needs and aspirations of people in a changing world by building on our land-grant foundation."

I urge you to use this catalog — join us as the university moves to the next level. I believe that many more successes await us.



Joseph A. Chapman  
President

## Disclaimer

The State Board of Higher Education requires that the following announcement be published in all catalogs and bulletins of information issued by the state educational institutions of North Dakota: "Catalogs and bulletins of educational institutions are usually prepared by faculty committees or administrative officers for the purpose of furnishing prospective students and other interested persons with information about the institutions that issue the same. Announcements contained in such printed materials are subject to change without notice, and may not be regarded in the nature of binding obligations on the institutions and the State. In times of changing conditions, it is especially necessary to have this definitely understood."



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## University Telephone Numbers

	Area Code 701
Admission	231-8643
<a href="http://www.ndsu.edu/prospective_students">www.ndsu.edu/prospective_students</a>	
Business Office	231-7320
<a href="http://www.ndsu.edu/business_office">www.ndsu.edu/business_office</a>	
Counseling Center - Disability Services	231-7671
<a href="http://www.ndsu.edu/counseling">www.ndsu.edu/counseling</a>	
Graduate School	231-7033
<a href="http://www.ndsu.edu/gradschool/">www.ndsu.edu/gradschool/</a>	
International Programs	231-7895
<a href="http://www.ndsu.edu/International/IntlSt/ism.shtml">www.ndsu.edu/International/IntlSt/ism.shtml</a>	
Multicultural Student Services	231-1029
<a href="http://www.ndsu.edu/multicultural">www.ndsu.edu/multicultural</a>	
Orientation and Student Success	231-8379
<a href="http://www.ndsu.edu/student_success">www.ndsu.edu/student_success</a>	
Provost and Academic Affairs	231-7131
<a href="http://www.ndsu.edu/vpaa">www.ndsu.edu/vpaa</a>	
Registration and Records	231-7981
<a href="http://www.ndsu.edu/registrar">www.ndsu.edu/registrar</a>	
Residence Life (Housing)	231-7557
<a href="http://www.ndsu.edu/reslife">www.ndsu.edu/reslife</a>	
Student Affairs	231-7701
<a href="http://www.ndsu.edu/vpsa">www.ndsu.edu/vpsa</a>	
Student Financial Services	231-7533
<a href="http://www.ndsu.edu/finaid">www.ndsu.edu/finaid</a>	
University Switchboard	231-8011

Information in this bulletin will be made available in alternate formats upon request. Please place your request by calling 701-231-7198.

## Reservation of Rights

Every effort has been made to provide accurate and current information; however, the right is reserved to change any of the rules and regulations of the university at any time, including those relating to admission, instruction, and graduation. The right to withdraw curricula and specific courses, change or discontinue programs, alter course content, change the calendar, and to impose or increase fees similarly is reserved. In some cases, requirements for programs and prerequisites for courses offered are effective even if they are not listed in this bulletin. All such changes are effective at such times as the proper authorities determine, and may apply not only to prospective students but also to those who already are enrolled in the university.

# OVERVIEW

## Mission

With energy and momentum, North Dakota State University addresses the needs and aspirations of people in a changing world by building on our land-grant foundation.

## Vision

We envision a vibrant university that will be globally identified as a contemporary metropolitan land-grant institution.

## Core Values

NDSU is guided by the following key values and principles:

### *Land-grant*

- We reflect and serve geographically and culturally diverse populations.
- We share institutional success across the university.
- We anticipate and welcome growth and service that will occur in ways yet to be conceived.
- We embrace our unique complexities as a land-grant university on the Northern Great Plains.
- We remain committed to serving people globally.

### *People*

- We derive strength and vitality from each other and from the diverse communities we serve.
- We care about the current and future welfare of our students, staff, and faculty.
- We promote excellence through individuals participating in decisions and value cooperation for the common good.

### *Scholarship*

- We are an engaged university and acknowledge and pursue scholarship of all forms, including discovery, teaching, integration, and application.
- We uphold the rights and responsibilities of academic freedom.

### *Teaching and Learning*

- We provide a superior teaching and learning environment within and outside of the traditional classroom.
- We promote and value liberal, graduate, and professional education in a collegial environment where divergent ideas can be shared.
- We foster an environment that promotes life-long learning with individually-defined goals.

### *Ethics*

- We maintain our integrity through principled action and ethical decision-making.

### *Culture*

- We will be the land-grant university that we want to be by welcoming and respecting differences in people and ideas.
- We support the goals of the North Dakota University System and value collaboration with colleges and universities around the world.
- We foster accessibility to our programs and services.

### *Accountability*

- We have a special relationship with, and are accountable to, the people of North Dakota.
- We actively strive to contribute to our region's economic prosperity and to improve the quality of life.

## Campus Themes

### *It's About People*

North Dakota State University exists as a human endeavor; a means to accomplish a greater good. It's About People, acknowledges the service we do for our fellow citizens, but also emphasizes the institutional commitment to the people of North Dakota State University and our desire to reward those whose efforts are serving the public's interests.

### *Students are Paramount*

In recent years, NDSU has seen tremendous growth in the size of our student body from some 9,700 students in 1999 to our goal of more than 12,000 students. NDSU's growth is grounded in the strength of our existing programs and fueled by the strategic addition of new programs. Undergraduate education remains the foundation of our educational offerings while new graduate programs are retaining and keeping young people in the state. NDSU students are active partners in our institutional transformation.

## Programs

In these past few years, we have successfully launched many new undergraduate and graduate programs. Total doctoral enrollment has risen from about 150 to 500 students. We have reinforced the integrity of NDSU's academic offerings by emphasizing our faculty's expertise in research and creative activities while maintaining our focus on teaching and learning.

## Leveraging Support

NDSU's growth is a major contributor to the state's economy. The direct economic impacts of NDSU growth in Fiscal Year 2000 was about \$14 million and by Fiscal Year 2005 grew to more than \$105 million. Over the past five years, the State of North Dakota has increased state appropriated support of NDSU by \$45.2 million. The University has leveraged those state resources by securing \$433 million from other sources. Thus, for every additional dollar of state support, we have obtained roughly \$9.60 of additional funds. In total, the impact of NDSU's growth over the last six years exceeds \$1 billion.

## Stature

NDSU is experiencing a period of remarkable success. Few universities have experienced our growth in enrollment, research expenditures, program expansion, or growth in campus infrastructure in such a short time. Our faculty, staff and students have seized upon an opportunity to be more and have catapulted this university forward. NDSU's institutional stature also is being increased through a very successful transition in intercollegiate athletics to Division I. We are increasing awareness of our state and representing North Dakota with pride and competitive excellence.

## NDSU in Perspective

### *A Bit of History*

North Dakota had been a state less than a year when Gov. John Miller signed a bill on March 8, 1890, designating a square mile of land adjoining Fargo as the site of the new campus and demonstration farm under the name North Dakota Agricultural College and Agricultural Experiment Station.

With President Horace E. Stockbridge and five faculty members, the university opened for its first collegiate year on Sept. 8, 1891. A total of 30 students were listed in the 1891 Prospectus as being "matriculated in the Special Course."

Through its proud history, the campus has gained a strong reputation for quality in education, research and service. An engaged university and a leader among its peers, NDSU is emerging as a model of the contemporary metropolitan land-grant university.

### *The Land-Grant Heritage*

Honoring the commitment of the Morrill Act of 1862, the land-grant universities were established to provide studies that were a blend of technical and academic subjects. Known as a "people's college," NDSU was part of the bold experiment to provide access to a college education for the common person.

NDSU, the state's first land-grant institution, is well positioned to prepare graduates for the global marketplace and technologically oriented economy. Through a statewide network of centers and electronic technology, NDSU provides a growing capability for delivering education, cultural activities and information to schools and homes throughout North Dakota. NDSU is a publicly supported comprehensive land-grant institution, with a strong agriculture and applied science tradition.

## NDSU Today

NDSU is clearly an institution of choice. Having experienced a remarkable period of growth and with the development of expanded academic opportunities, NDSU is a national model of the contemporary land-grant institution.

A university with more than 12,000 students in its undergraduate and graduate programs, NDSU's research expenditures surpass \$100 million annually.

The Carnegie Foundation for the Advancement of Teaching classifies NDSU among "Research Universities (high research activity)" in its new "basic" classifications of United States colleges and universities. NDSU is in the same Carnegie category as institutions such as Boston College, Brigham Young University, Clemson University, Georgetown University, Marquette University, Temple University, and the University of Oregon.

An institution committed to progress, NDSU continues to advance in all areas because of the energy and dedication of faculty, staff, students, alumni, and friends.

### *Accreditation*

NDSU is accredited as an institution by the North Central Association of Colleges and Secondary Schools. Inquiries may be directed to the North Central Association of Colleges and Schools Commission on Institutions of Higher Education, 30 North

LaSalle St., suite 2400, Chicago, IL 60602-2504. In addition, many programs are accredited or approved by their respective professional organizations and agencies. Program accreditation or approval is listed in the college sections of this bulletin.

### **The Faculty**

NDSU has more than 500 resident faculty members. Because of the nature of a land-grant university, many faculty hold joint appointments with affiliated research organizations on the campus.

### **Divisions**

#### ***Division of Academic Affairs ([www.ndsu.edu/vpaa](http://www.ndsu.edu/vpaa))***

The Provost and Vice President for Academic Affairs responsibilities include academic resources and budget, professional faculty matters, academic computing, and the university's curriculum of instruction.

#### ***Division of Agriculture, Food Systems, and Natural Resources ([www.ag.ndsu.nodak.edu/ag-vp/vp-page.htm](http://www.ag.ndsu.nodak.edu/ag-vp/vp-page.htm))***

NDSU Agriculture is an education, research, and outreach partnership consisting of the NDSU College of Agriculture, Food Systems, and Natural Resources; North Dakota Agricultural Experiment Station; NDSU Extension Service; NDSU Research and Extension Centers; and the Northern Crops Institute. Its mission is to foster North Dakota communities as vital economic and social units through the formation of partnerships that educate the public in agriculture, life, and environmental disciplines; provide creative, cost-effective solutions to current problems; and pursue all relevant fundamental research.

#### ***Division of Business and Finance ([www.ndsu.edu/ndsu/vpbf](http://www.ndsu.edu/ndsu/vpbf))***

The Business and Finance operations provide the administrative leadership, planning, and management for university financial affairs, human resources, purchasing, physical plant, and auxiliary services. Business and Finance is committed to creating an environment that provides high-quality support for the instruction, research, and outreach functions of the university.

#### ***Division of Research, Creative Activities and Technology Transfer ([www.ndsu.edu/research/](http://www.ndsu.edu/research/))***

The Division of Research, Creative Activities and Technology Transfer (RCATT) is dedicated to advancing NDSU research, creative activities, and technology transfer; fostering entrepreneurial projects; interacting with the N.D. Legislature, the Board of Higher Education, federal program officers and administrative personnel, and congressional delegations and their staffs; providing leadership for enhancing NDSU's national status as a research and graduate institution; and establishing NDSU's new Research and Technology Park.

#### ***Division of Student Affairs ([www.ndsu.edu/vpsa](http://www.ndsu.edu/vpsa))***

The Division of Student Affairs at NDSU serves student needs by providing specialized services, educational programs, and offerings directed at academic and student personal growth. Division personnel encourage student involvement within the university and serve as advocates for student concerns. Division functions are provided in a spirit of support for the teaching, research, and public service of the university.

#### ***Division of University Relations ([www.ndsu.edu/university\\_relations](http://www.ndsu.edu/university_relations))***

The mission of University Relations is to build public understanding of and strong public and private support for North Dakota State University and to continue to attract and retain outstanding students. The mission can be accomplished through an on-going series of activities designed to inform, educate, and persuade the citizens of North Dakota, the region, and the nation about the areas of excellence at NDSU. In addition, the program is intended to recognize the contributions of the citizens to the university.

### **The Campus**

The NDSU campus includes 104 buildings on nearly 41 square blocks or 258 acres. With an infrastructure of 5.8 miles of streets, 16.7 miles of sidewalks, 59.4 acres of parking lots, 5.2 miles of steam lines, 8.6 miles of water lines, 4,800 miles of outside telephone/data conductor cable, 58 miles of cable TV, 13.1 miles of sewer lines, and 22.3 acres under irrigation, NDSU is a small city within itself. In all, NDSU is located on 22,053 acres of North Dakota land. This includes the main Agricultural Experiment Station in Fargo and eight research centers throughout the state.

### **Academic Program**

NDSU offers more than 100 undergraduate and graduate programs of study in nine academic colleges. Degrees are awarded at the doctoral, master's, and baccalaureate levels. Various undergraduate minors and certificate programs also are available. For a list of programs current at the time of this publication, refer to Majors and Degrees Available in the Academic Information and Regulations section of this bulletin.

## **University Services and Outreach**

### ***Experiment Station and Extension ([www.ag.ndsu.edu](http://www.ag.ndsu.edu))***

In keeping with its historical strength in agricultural research, NDSU Extension Service offices are located across the state, and more than 18,000 acres are dedicated to agricultural research. In addition to the main North Dakota Agricultural Experiment Station at Fargo, facilities include:

- Agronomy Seed Farm, Casselton
- Carrington Research Extension Center
- Central Grasslands Research Extension Center, Streeter
- Dickinson Research Extension Center
- Hettinger Research Extension Center
- Langdon Research Extension Center
- North Central Research Extension Center, Minot
- Williston Research Extension Center

### ***Facilities Management (<http://facilities-mgmt.ndsu.nodak.edu>)***

Facilities Management provides many services to the NDSU academic community with its 150 person staff. The services include: building maintenance/construction, custodial, grounds/landscape, utilities, public and environmental health and safety, motor pool, telecommunication, mail delivery/moving, 24/7 communication center, and central stores. Most units within Facilities Management are located in the Thorson Maintenance Center on Bolley Drive, 231-7911. However, the Office of Safety and Environmental Health is located in the Animal Nutrition and Physiology Center Annex on 18th Street, 231-7759. Emergencies on weekends and evenings should be directed to 231-8998.

### ***Information Technology Services (<http://its.ndsu.nodak.edu>)***

Information Technology Services (ITS) is a strategic partner that helps advance the educational, research, and administrative potential of the university. A wide range of IT resources and support services are available to NDSU students, faculty, and staff. ITS administrative offices are located in the Industrial Agriculture and Communications Center (IACC) building.

#### ***Infrastructure:***

ITS provides the NDSU campus and student residence halls with high-performance, reliable data networking. NDSU is an Internet2 member with direct access to this highly advanced international network for research and collaboration. NDSU also is a part of North Dakota STAGEnet, a state government, university system and secondary education partnership for in-state data and video networking.

ITS also maintains the servers that support e-mail, Web, file, and other network-based services for faculty, staff, and students at NDSU and other North Dakota University System campuses. ITS provides research support services such as statistical consulting for faculty, staff, and students; professional services in support of the Center for High-Performance Computing; and consultation with researchers on the IT components of their grant proposals.

#### ***Computer Clusters and Classroom Support:***

Several hundred on-campus computers are available for student use, and for instructional purposes. The diverse computing environment includes UNIX, Windows, and Macintosh machines, all having Internet access through a direct campus network connection. Specific support services offered include problem resolving assistance; color printing, plotting, equipment checkout (i.e., VCR, projection equipment, laptops, digital cameras); multimedia assistance, video-editing, cluster and equipment reservations, and scheduling.

#### ***Help Desk:***

Students, faculty, and staff needing help with e-mail accounts, wireless or Ethernet connections, and general computing questions can contact the ITS Help Desk. Various publications and online documents are available to students and faculty to help with computing needs. The Help Desk is located in the IACC 150A.

#### ***Training:***

ITS provides a wide range of technology training for faculty and staff. Free technology training for NDSU students is available through funding provided by the Student Technology Fee. Most classes are short sessions and offer hands-on experience with a variety of software programs and other current technologies. Classes range from introductory to advanced skills.

#### ***Interactive Video:***

NDSU has several distance education technologies available for courses, meetings, and seminars. The North Dakota Interactive Video Network (IVN) is a broadcast-

quality, two-way audio and video system that can connect to more than 300 locations in North Dakota and to other compatible video systems world-wide. Locations in North Dakota include higher education institutions, K-12 schools, Tribal Colleges, and government and state agencies.

#### **Blackboard:**

Blackboard is a powerful, easy to use, online course management system that enables instructors to provide students with course materials, discussion boards, virtual chat, calendaring, digital file exchange, on-line assessments, and grading.

#### **Research Support Services:**

ITS provides research support services such as statistical consulting for faculty, staff, and students; professional services in support of the Center for High-Performance Computing; and consultation with researchers on the IT components of their grant proposals.

#### **EduTech:**

NDSU cooperates with the state Information Technology Department and the Educational Technology Council to operate EduTech, which provides information technology services and related professional development for K-12. EduTech's mission is to provide North Dakota educators and students with opportunities that extend learning in the classroom and beyond, focusing on the use of technology to improve student achievement.

#### **NDSU Libraries** ([www.lib.ndsu.nodak.edu](http://www.lib.ndsu.nodak.edu))

The North Dakota State University Libraries play an essential role in the educational and research activities of the university.

The collections include more than 500,000 bound volumes, 10,000 print and electronic full text current serials, 90,000 maps, and a variety of audiovisual materials. As a Regional U.S. Government Publications Depository, NDSU and the University of North Dakota share deposited publications from the U.S. Government. More than 400,000 U.S. government documents are available in the NDSU Libraries. Archival and manuscript records, historical publications, photographs, and other documents concerning North Dakota and NDSU are housed in the North Dakota Institute for Regional Studies and University Archives.

The Libraries offer conference rooms, study rooms, and three computer clusters. The Main Library is open 96 hours per week during the academic year; departmental libraries are open 70 hours per week. Hours for holidays, summer sessions, and break periods are posted throughout the Libraries and announced in campus publications. Call 231-9456 or check the library Web site for current information regarding hours.

The Libraries' holdings may be accessed via the online catalog. In addition to NDSU collections, the online catalog interfaces with other online catalogs of academic, public, and special libraries in North Dakota, South Dakota, and Minnesota.

NDSU is a member of the Tri-College University and shares library resources with Minnesota State University Moorhead and Concordia College. The daily shuttle service that operates among the Tri-College libraries, medical and public libraries in Fargo-Moorhead is supplemented by a daily shuttle with the UND Libraries. NDSU faculty, students, and staff library cards also are valid at the MSUM and Concordia Libraries. Interlibrary Loan Service provides access to the collections of libraries throughout the region, the nation, and the world.

NDSU Libraries offer a full range of library education services including general tours and orientations, course-related instruction in specific subject areas, demonstrations of special services and information formats, plus several credit courses.

#### **Institutional Research and Analysis** ([www.ndsu.edu/oira](http://www.ndsu.edu/oira))

The Office of Institutional Research and Analysis directs activities that empirically describe and evaluate the educational, administrative, and support functions of NDSU. OIRA provides standard reports to serve academic and administration functions for both internal and external users.

#### **Statistical Consulting Service**

([www.ndsu.nodak.edu/ndsu/doetkott/StatConsult.html](http://www.ndsu.nodak.edu/ndsu/doetkott/StatConsult.html))

Consulting assistance is provided for students, faculty, and staff with statistical aspects of research including planning a study, organizing and analyzing data, and communicating the results.

#### **Research and Technology Park** ([www.ndsuresearchpark.com](http://www.ndsuresearchpark.com))

The Research and Technology Park has become a stimulus for research and technology transfer between NDSU researchers and companies within the region and nationally. Fields of potential interest include all areas of the sciences, engineering, and technology. Currently, areas of special interest include nanoscale science and engineering, materials science, sensor technology, artificial intelligence, and robotics. More opportunities are continuously evolving. The anchor tenant of the Park, Phoenix International Corp., held dedication ceremonies for its new building on May 12, 2001. A John Deere Company and manufacturer of electronic controls and sensors, Phoenix has developed agreements with NDSU for the sharing of needed research and expertise.

#### **Alumni Association** ([www.ndsualummi.com](http://www.ndsualummi.com))

The NDSU Alumni Association strives to engage more than 70,000 alumni with the university by providing communication, leadership, and programming. The Alumni Association is a private organization directed by a 30-member board of directors. Alumni are critical to the success of the institution by providing guidance, volunteer time and talent, and financial support.

#### **Centers and Institutes**

([www.ndsu.edu/research/centers\\_institutes.php](http://www.ndsu.edu/research/centers_institutes.php))

**Bio-Imaging and Sensing Center:** A multidisciplinary center in the College of Agriculture, Food Systems, and Natural Resources, it is located in NDSU's Department of Agricultural and Biosystems Engineering and the Industrial and Agricultural Communication Center. This center conducts fundamental and applied research in advanced sensor and information technologies such as computer imaging, sensing and decision support methods for applications in the agricultural and food industries. This center was established in 2000.

**Bison Center of the Northern Plains:** The center is a virtual organization with contributing scientists in several disciplines and departments. It serves as an information clearinghouse, drawing on research from NDSU as well as other institutions. Bison research at NDSU focuses on ruminant nutrition, meats, and disease issues with economics and marketing addressed as well. Center faculty maintains an active relationship with bison researchers in other states and Canadian provinces, especially with the Alberta Bison Centre of Excellence. The Center serves bison producers and anyone interested in the species from all over the North American Continent.

**Cell Biology Center:** The CBC is located in Hultz Hall and is a state-of-the-art facility for research in cell biology. Since its inception in 1989, it has provided research support to numerous faculty, postdoctoral fellows, and graduate and undergraduate students from NDSU and throughout the Midwestern states.

**Center for 4-H Youth Development:** 4-H Youth Development creates supportive learning environments for youth and adults to reach their fullest potential as capable, competent, and caring citizens. The center provides formal and non-formal community-focused experiential learning; develops skills that benefit youth throughout life; fosters leadership and volunteerism in youth and adults; builds internal and external youth/adult partnerships for programming and funding; strengthens families and communities; and uses research-based knowledge and the land-grant university system.

**Center for Advanced Technology Transfer and Traineeships (CATT):** CATT was established in October 2000 to increase technology transfer awareness and activities by NDSU students and faculty. CATT's Technology Transfer Graduate Traineeship program (TTGT) is designed for graduate assistants who develop or utilize advanced technology in their thesis/dissertation research, and who are interested in commercializing their research. The program is designed to supplement student assistantships and encourage graduate students and faculty to engage in technology transfer activities.

**Center for Agricultural Policy and Trade Studies:** The center was established in 1998 as the Northern Plains Policy and Trade Research Center to analyze a wide range of agricultural trade and policy issues affecting the economic well-being of the northern plains. The name was changed in 2000 to incorporate issues related to agricultural policy and farm income. Economic research and outreach activities include (a) analyzing national agricultural policies, multilateral trade treaties, regional trade agreements, and cross-border trade issues for northern grown crops and processed products, and (b) developing strategies to improve export opportunities for northern grown crops and processed products. Outlooks for the North Dakota farm economy, the U.S. and world wheat industries, and the U.S. and world sugar industries are published annually.

**Center for Child Development:** Created in 1955, the center is accredited by the National Academy of Early Childhood Programs. The center is a laboratory school for NDSU students to observe, do research, and to participate in a high-quality program and developmentally appropriate environment for children ages 6 weeks to 6 years. Child Care and education are available full days during the academic year for students, faculty, staff, and the community. Contact the Center for more details. Center for Community Vitality: The center builds capacity in North Dakota communities by uniting, coordinating, and marketing NDSU outreach efforts in community economic development and leadership.

**Center for Corrosion/Coatings Research:** Established in 1992, the Center for Corrosion/Coatings Research is an interdisciplinary research program which involves the application of modern electrochemical techniques to the characterization of corrosion in organic coatings/metal systems. It is the only university research program which focuses on the issues of corrosion control by organic coatings both from applied and theoretical aspects. Its main thrusts are the understanding of how real organic coatings systems provide corrosion protection in hostile environments,

the development of new characterization methods appropriate to coating/metal systems, the development of sensors for possible in situ studies, development of test protocols that will enable coatings designers to rapidly screen candidate coatings systems for corrosion protective properties, and the development of improved models for corrosion control by coatings.

**Center for Heritage Renewal:** The Center was established in 2006 as part of the North Dakota Institute for Regional Studies. Its purpose is to conduct research in the area of historic preservation in the broadest sense of collecting and analyzing oral and written records, architectural features, and other tangible evidence of the heritage of Plains and Prairies Peoples.

**Center for High Performance Computing (CHPC):** Located in the NDSU Research & Technology Park, CHPC was established as a Center of Excellence by the N.D. State Board of Higher Education in June 2003. The objectives of the center are (1) to meet the high performance computing needs of the NDSU research community and its public/private sector partners, and (2) to provide the user community with strategic information-based services such as data to serve as an anchor tenant in North Dakota's research corridor. The CHPC platforms include clustered computers from Silicon Graphics, Inc. and DakTech, a Fargo-based computer company, and utilize the Linux operating system and other open-source development tools.

**Center for Nanoscale Science and Engineering (CNSE):** CNSE is engaged in interdisciplinary research at the micro and nanoscale levels of science and engineering. Working with partners in government and the private sector, our goal is to develop practical materials, processes and devices with potential for world impact. CNSE began in August 2001 with a Department of Defense contract to establish a Center for Excellence for micro and nanosensor systems, and to begin research on low-power, miniature battlefield sensors.

**Center for Nutrition and Pregnancy (CNP):** CNP was formally approved by the N.D. State Board of Higher Education in December 2002. The mission of the center is to provide coordinated research activities focused on the impact of nutrition during pregnancy on health of the mother, fetus, and offspring. Research over the last 60 years has demonstrated that maternal nutrition has a dramatic impact on birth weights and long-term health and productivity in humans and animals. The current investigators comprise an established team of nutritionists and physiologists who are internationally recognized for their work in this area. In addition, these scientists are located in outstanding research departments and institutions. For example, the Rowett Research Institute, in Aberdeen, Scotland, is one of the premiere human and animal nutrition research institutes in the world and boasts three Nobel laureates.

**Center for Protease Research (CPR):** Funded by a five-year, \$8.25 million grant from the National Institutes of Health - National Center for Research Resources, CPR is a multidisciplinary research center coordinating the expertise of faculty from the departments of chemistry and pharmaceutical sciences. The center's aim is to help combat diseases including arthritis, diabetes, and cancer. Research focuses on a class of enzymes called matrix metalloproteinases (MMPs), which play vital roles in biological functions. Too much or too little MMP activity may contribute to diseases.

**Center for Science and Mathematics Education:** The center was established in 1998 to develop and administer collaborative K-16 educational projects in science, mathematics, engineering, and technology. The center coordinates competitive events such as the N.D. Science Olympiad and the Science Fair. The center facilitates the NSF-funded GK-12 (GraSUS) and N.D. Master Science Teaches (MSTeP) programs. Several research grants centered on science, mathematics, and engineering education are administered by the center, including those of the World Wide Web Instructional Committee (WWWIC).

**Center for Social Research:** Established in 1976, the center facilitates such social-science research as conducting focus group studies and computerized telephone and mail surveys.

**Center for Writers:** The center provides free writing assistance to students, faculty, and staff in all departments and at all levels. Writing consultants work with writers during prewriting, writing, and rewriting stages of their work. The consultants also work to further writing across the curriculum and writing in the disciplines by working with instructors at all levels and in all disciplines to develop effective writing assignments and effective response strategies to writing.

**The Center of Rural Studies:** Established in 2000, the center works to enhance the quality of life of rural residents of the Northern Plains through coordinated research and information dissemination efforts.

**Computer Systems Institute:** Created in 1983, the institute promotes and supports multi-disciplinary research and development activities in computer systems, and especially in computer systems with applicability to commerce, farming, and industry in North Dakota. Computer systems are complex aggregates of digital computer hardware and software, designed to carry out specific tasks or purposes. The institute

serves as an organizational structure to seek research support, equipment, and projects aimed at the growth of computer systems design expertise in North Dakota. This includes the development of expertise at NDSU and nearby universities as well as collaboration with industry in research and development that promotes computer systems design expertise in the state.

**Emily P. Reynolds Historic Costume Collection:** The collection is a repository of material culture focusing on clothing, textiles, and related items. Items from all over North Dakota, the surrounding regions and the world are included in the collection, but the collection concentrates on items worn or used in North Dakota. The collection is available to researchers and to the general public by request.

**Engineering Research Center (The Engineering and Architecture Experiment Station and Extension Service):** Special research activities and projects of the college are coordinated through the Experiment Station. The professional services of faculty and the facilities of the college are available to both private and governmental agencies for research and development studies on engineering or architectural problems. Research projects of individual faculty members are sponsored and promoted by the station.

**Family Therapy Center:** The center serves individuals, couples, and families who seek understanding and resolution of problems associated with their relationships. Problems may include communication, relationship conflicts, child and adolescent problems, family violence, substance abuse, divorce, parent-child conflict, sexual abuse, depression, and anxiety. The FTC is operated as part of the graduate program in Couple and Family Therapy, which is accredited by the Commission on Accreditation for Marriage and Family Therapy Education. The center is located in the Alba Bales house. FTC therapists, staff, and faculty are Safe Zone Allies.

**Germans from Russia Heritage Collection (GRHC):** GRHC, located in the NDSU Libraries, was established in 1978. Their mission is to collect, document, preserve, exhibit, translate, publish, promote, and make accessible resources on the culture, history, folklore, textiles and clothing, and foodways of the Germans from Russia, particularly Bessarabian Germans, Black Sea Germans, Crimean Germans, Dobrukscha Germans, Volga Germans, Vollynian Germans, and their descendants in North Dakota and the Northern Plains. In various ways, GRHC affirms the heritage of the Germans from Russia as an important part of the Northern Plains culture. GRHC has one of the most comprehensive collections world-wide, outreach programs, an active oral history program, and continuing education.

**Great Plains Institute of Food Safety (GPIFS):** GPIFS ensures the safety and security of our food supply using a tripartite approach to food safety with education and outreach, service, and research components. Faculty participants of GPIFS come from a wide variety of disciplines allowing us to apply multidisciplinary approaches to problems all along the food chain, i.e., from farm-to-fork. All participants are avid teachers and researchers, each dedicated to serving the public's food safety needs. Our researchers use "state-of-the-art" approaches to provide for early detection of food safety problems, their prevention, or amelioration.

**Group Decision Center:** A mobile facility that hosts and facilitates group data collection using an electronic medium. Group information is collected through the means of an electronic discussion software tool. The center hosts various meeting styles, all participants to be both anonymous and simultaneous. Web-based surveys allow information to be gathered quickly from a large number and variety of participants. The center staff works with clients from the campus and business communities to develop effective meetings and surveys.

**Institute for Natural Resource and Economic Development (INRED):** The grant-driven institute offers professional services in four major areas — economic feasibility analysis, economic and fiscal impact assessments, analyses of natural resources management, and investigation of population and labor force dynamics. In addition to institute personnel, unique expertise from both public and private sectors in the region, nation, and world are accessed as needed to meet research and training requests. Initially founded as the Northern Plains Natural Resources Institute in 1984, the name was changed in 1995.

**North Dakota Institute for Pharmaceutical Care:** The institute is an outreach arm of the College of Pharmacy. Initiated in 1996 and reorganized in 2003, their purpose is to help pharmacists improve their practice and provide them with a ready source of health and drug information and assessment skills. The institute also provides information concerning an array of certificate training programs in pharmaceutical care and provides follow-up support to pharmacists who are implementing a program.

**North Dakota Institute for Regional Studies:** Founded in 1950, the institute stimulates and coordinates activities of NDSU in regional scholarship. Their mission is to foster understanding of regional life through research on, teaching about, and service to those regions with particular import to NDSU. These regions include the Red River Valley, the state of North Dakota, the Plains of North America (including the Great Plains of the United States and the Prairies of Canada), and comparable

regions of other continents. In keeping with the land-grant university tradition, both knowledge and application are pursued. Institute activities include four categories: collections, publications, outreach, and the Center for Social Research. Institute research collections are housed in the Institute Room in the Skills and Technology Center, 1305 19th Ave. N., Fargo, under the curatorship of institute staff. The publications programs are housed in the College of Arts, Humanities and Social Sciences. Outreach activities involve various units of the university and include radio and television production, public programs, and oral history.

**North Dakota Agricultural Weather Network (NDAWN):** NDAWN is comprised of 67 automatic weather stations throughout North Dakota and the Red River Valley. The network is designed to monitor and record local weather conditions and disseminate information through its Web site or in near real time over the phone. The data is timely available, detailed, accurate, and released through a comprehensive array of applications, summaries, and innovative displays, free to all.

**North Dakota Kids Count:** Established in 1986, the center was transferred to NDSU in 2000. Its primary research mission is to track the status of the health and well being of children in North Dakota. It is part of a national network of Kids Count programs that exist in every state and is sponsored by the Annie E. Casey Foundation. The center serves as a clearinghouse for data reflecting children's education, social, economic, and physical well being.

**North Dakota State Data Center:** Established in 1991, it serves as the lead agency for a network of affiliate centers throughout North Dakota and works in cooperation with the U.S. Bureau of the Census to receive and distribute economic and demographic information. Services include responding to requests, conducting research, compiling information, and disseminating research findings to meet the demographic and economic needs of North Dakota.

**North Dakota Transportation Technology Transfer Center:** Established in 1984, the center is administered by the Department of Civil Engineering and Construction. It is tasked under the Federal Highway Administration Local Technical Assistance Program and networked with 57 other centers nationwide. The center is dedicated to exchanging transportation related technology, innovations, and research with local government and transportation units in North Dakota. Technical assistance, information services, and training are provided through videotape and publication libraries, newsletters, interactive distance communications, and onsite extension services.

**North Dakota Water Resource Research Institute:** The institute is one of 54 federally-sponsored entities known collectively as the National Institutes for Water Resource to conduct research, education, and information transfer on water resources. The primary goal is to coordinate research projects that address water problems of North Dakota and the region. The institute awards competitive graduate research fellowships.

**Northern Crops Institute (NCI):** The NCI is a regional institute including North Dakota, Minnesota, South Dakota, and Montana. The mission of NCI is ultimately to benefit farmers and the regional economy by providing educational and technical service programs that support the promotion and market development of northern-grown crops into domestic and export markets. Programs serve buyers and processors of Northern-grown crops, producer commodity organizations, agricultural groups and agencies, and others in agribusiness impacted by world trade.

**Northern Plains Ethics Institute (NPEI):** The NPEI provides a forum for democratic deliberations about the future of the Northern Plains. The institute includes think tanks that address the broad themes of education, security, business, healthcare, environment, and culture, and works to develop more as issues warrant. The underlying vision for the NPEI is that the health of our society must be the focus of citizens' participation: this follows the dictum, "Education is first for responsible citizenship." The institute, accordingly, sees its area of responsibility both inside NDSU and in the public arena of the Northern Plains.

**Quentin N. Burdick Center for Cooperatives:** Created in 1992, the center is endowed by cooperatives to provide education, research, and outreach to cooperatives, organizations, or other interested persons. Education includes teaching and preparing materials for university courses on cooperatives and conducting training programs for cooperatives. Research is conducted on general issues affecting cooperatives including specific, confidential research on marketing and feasibility studies. Outreach includes providing direct assistance to cooperatives and supporting professional co-op organizations.

**Robert Perkins Engineering Computer Center:** The center assists North Dakota industries with the use of a communication network of sophisticated industrial tools through Computer-Aided Design and Computer-Aided Manufacturing systems. All of the high-technology programs are currently directed toward the economic development of existing industries.

**Skills and Technology Training Center:** The STTC (Fargo) was established in 1997 to benefit the southeast workforce training region of North Dakota. It is a division of

North Dakota State College of Science's "College Outreach Division." The STTC is a public/private organization focused on providing training opportunities for business and industry in Fargo-Moorhead and the surrounding area.

**Small Business Institute:** The institute provides customized, in-depth, confidential consulting to regional businesses in strategic planning, supply chain management, operations and productions, technology transfer and marketing.

**Upper Great Plains Transportation Institute:** Created by the North Dakota Legislature in 1967, the institute focuses on improving transportation for people in small urban and rural settings. Its goal is to enhance economic efficiency, increase competitiveness, improve mobility and promote safety. The institute participates in interdisciplinary graduate degree programs, including a Ph.D. program in transportation and logistics.

**Value-added Processing Center:** The center generates and disseminates information to help growth of the food and agricultural processing industry in North Dakota. Its objective is to add value to the agricultural materials produced in the state, thereby contributing to the development of North Dakota's economy.

## Rights and Responsibilities

### Student Behavior ([www.ndsu.edu/ndsu/vpsa/code](http://www.ndsu.edu/ndsu/vpsa/code))

Every NDSU student has the responsibility to observe and to help maintain a code of personal behavior and social relationships that will positively contribute to the educational effectiveness of the university. To this end, students are expected to observe the university standards published in this Code, and those outlined in any other university policies, regulations, contracts, or license contracts published elsewhere. In addition, students are expected to observe the laws of the community, the state and the nation. These behavioral standards apply to all students who have been admitted to the university, to previously enrolled students for any act committed while they were enrolled students, to students otherwise associated with the university, and to all visitors as long as they are on campus. The complete document on university regulations and policies relevant to student life is entitled "Rights & Responsibilities of Community: A Code of Student Behavior" is available from the Office of the Dean of Student Life, 368 Memorial Union, or online.

### Privacy of Student Records ([www.ndsu.edu/ndsu/vpsa/code](http://www.ndsu.edu/ndsu/vpsa/code))

The disclosure of student educational records is governed by policies developed by North Dakota State University in compliance with state law and the Family Educational Rights and Privacy Act of 1974 as amended (FERPA). There are essentially two types of student records, public directory information and nonpublic information. Directory information may be released publicly except in cases where students have specifically requested that the information not be released. Nonpublic information which includes the academic transcript, is considered confidential and will not be released, other than to authorized personnel or as allowed by law, without the written authorization of the individual. NDSU may forward academic records to other post-secondary institutions that have requested such records and in which the student intends to enroll. University policies relative to student records are specified in the FERPA annual notice, the "NDSU Policy Manual," Section 600, and contained in the publication entitled "Rights & Responsibilities of Community: A Code of Student Behavior," which may be obtained from the Office of the Dean of Student Life, 368 Memorial Union. Students may restrict the release of directory information no later than the tenth class day of the semester at the Office of Registration and Records, 110 Ceres.

### Equal Opportunity Policy ([www.ndsu.edu/equity](http://www.ndsu.edu/equity))

North Dakota State University is fully committed to equal opportunity in employment decisions and educational programs and activities, in compliance with all applicable federal and state laws including appropriate affirmative action efforts, for all individuals without regard to race, color, national origin, religion, sex, disability, age, or Vietnam-era veteran status, sexual orientation, status with regard to marriage or public assistance, or participation in lawful activity off the employer's premises during non-working hours which is not in direct conflict with the essential business related interests of the employer.

More specifically, the university abides by the requirements of Title VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973 as well as the implementing regulations of the U.S. Department of Education (34 CFR Parts 100, 106 and 104, respectively), the Americans with Disabilities Act of 1990, and the North Dakota Human Rights Act of 1983.

Inquiries concerning compliance may be directed to the NDSU Director for Equity and Diversity, 202 Old Main, 231-7703, or to the Office for Civil Rights, Chicago Office, U.S. Department of Education, 111 N. Canal Street, Ste. 1053, Chicago, IL 60606-7204, 312-886-8434, 312-553-4888 (fax), 877-521-2172 (TDD), OCR.Chicago@ed.gov. The complete and current policy may be viewed online.

## Anti-Harassment Policy ([www.ndsu.edu/policy/163.htm](http://www.ndsu.edu/policy/163.htm))

North Dakota State University is committed to providing a climate that fosters respect for students, staff, and faculty as well as others who participate in programs and activities at the university. As part of that commitment, NDSU prohibits harassment based on gender, race, color, religion, national origin, age, disability, sexual orientation, or protected activity (such as reporting alleged harassment or providing information related to a grievance). This policy is in compliance with federal civil rights laws and agency regulations and guidance implementing these laws. Please note that harassment in electronic forms is also prohibited under NDSU Policy 710 - Computer Facilities.

Anyone who feels she/he has been subjected to prohibited harassment is encouraged to report the situation before it becomes severe or pervasive. Individuals may make a report to the Director for Equity and Diversity, the university's General Counsel, the Office of Human Resources/Payroll, the Counseling and Disability Services Office, the Associate Director for Student Rights and Responsibilities, or an appropriate administrator. Reports may be addressed on an informal basis at the request of the individual alleging harassment. The person alleging harassment may also file a formal grievance in the Office for Equity and Diversity using the Equal Opportunity Grievance Procedures described in NDSU Policy 156.

The university will not tolerate adverse actions/retaliation toward anyone who, in good faith, alleges harassment or who provides information related to a grievance. Such retaliation may be the basis for an additional grievance. The complete and current policy may be viewed online.

## Sexual Harassment Policy ([www.ndsu.edu/policy/162.htm](http://www.ndsu.edu/policy/162.htm))

As part of its commitment to equal opportunity, North Dakota State University prohibits sexual harassment of its employees and students, including student-to-student and other peer sexual harassment. This policy is in compliance with federal regulations implementing Title VII of the Civil Rights Act of 1964 and Title IX of the Education Amendments of 1972. Please note that sexual harassment in electronic forms is also prohibited under NDSU Policy 710 - Computer Facilities.

Individuals concerned about violations of this policy should request assistance from the university's Director for Equity and Diversity, the university's General Counsel, the Counseling and Disability Services Office, the Associate Director for Student Rights and Responsibilities, or an appropriate administrator. The complete and current policy may be viewed online.

## Consensual Relationships Policy

([www.ndsu.edu/policy/1621.htm](http://www.ndsu.edu/policy/1621.htm))

Consensual relationships that are of concern to North Dakota State University are those romantic or sexual relationships in which both parties appear to have consented, but where there is a definite power differential within the university between the two parties.

Consenting romantic and sexual relationships between instructors (meaning all who teach at the university — faculty members, other instructional personnel, and graduate or undergraduate students with teaching, advising, or tutorial responsibilities) and student (meaning any person studying with or receiving advising from the instructor); between supervisor (meaning any person in a position of authority over another — to hire and fire, to grant raises and oversee task performance) and employee (meaning any person working for the supervisor); and between employee and student (where there is an instructional, advisory, or an employment relationship between them) have the potential for extremely serious consequences and ought to be avoided. This list is not all-inclusive, but gives examples of the types of relationships that are covered by this policy.

Because of the possible difficulties associated with the power differential and because of potential conflicts of interest, North Dakota State University discourages all such consensual relationships. However, if a romantic or sexual relationship exists or develops between individuals having a power differential within the university, the person with greater power shall report it to an appropriate supervisor. For example, an instructor shall report the matter immediately to the department chair; a teaching assistant shall report it to the professor in charge of the course; and an employee shall report it to his/her supervisor. In each case, the administrative supervisor shall make suitable arrangements for the objective evaluation of the student's, employee's, or prospective employee's academic or job performance and for the protection of individual and university interests. The complete and current policy may be viewed online.

## Sexual Assault Student Policy ([www.ndsu.edu/policy/603.htm](http://www.ndsu.edu/policy/603.htm))

NDSU commits its resources to the following twofold process: 1) to provide crisis intervention and a judicial/disciplinary response for victims and alleged offenders, and 2) to educate and promote discussion on interpersonal abuse and violence.

Persons having knowledge about sexual assaults involving members of the NDSU campus community are urged to contact NDSU Police at 231-8998 or at Thorson Maintenance Building. Contacts may also be made at the Office of the Dean of

Student Life, 368 Memorial Union, 231-6537, or the Department of Residence Life, Auxiliary Enterprises Building, 231-7557.

Sexual assault is viewed as any sexual behavior between two or more people to which one person does not or cannot consent. NDSU relies upon North Dakota state law concerning sexual imposition which is much broader than the traditional concept of rape. NDSU prohibits sexual acts or contacts with others which can involve compelling a victim to submit to sexual acts or contacts by force or threat of force, use of intoxicants to substantially impair the victim's power to give consent, engaging in such acts when there is reasonable cause to believe the other person suffers from a mental state which renders him or her incapable of understanding the nature of the contact, or where the victim is a minor. A complete copy of the policy, reporting procedures, and related information is available at the Office of the Dean of Student Life, 368 Memorial Union, or online. The complete and current policy may be viewed online.

## Use of Alcohol and Other Drugs

([www.ndsu.edu/policy/155.htm](http://www.ndsu.edu/policy/155.htm))

NDSU complies with and supports the North Dakota State Board of Higher Education policy governing alcohol use on campus, the Drug Free Workplace Act of 1988, Public law 100-690 and the Drug-Free Schools and Communities Act Amendments of 1989, Public Law 101-226. The State Board of Higher Education prohibits the possession, sale, dispensation, use or consumption of alcoholic beverages upon land or in buildings owned by the Board or its institutions. Exceptions may include the lawful possession of alcohol in family student residences, on-campus professional staff residences, fraternities and sororities (in certain circumstances), the president's residence, and other special exceptions as granted by the president or the president's designee. For the complete State Board of Higher Education policy, see [www.ndsu.edu/policies](http://www.ndsu.edu/policies) (number 918 "Alcoholic Beverages"). The university prohibits the unlawful or unauthorized use, possession, storage, manufacture, distribution, or sale of alcoholic beverages and any illicit drugs or drug paraphernalia in university buildings, any public campus area, in university housing units, in university vehicles, or at any university affiliated events held on or off-campus, which are sponsored by students, employees, and their respective campus organizations (including all fraternities and sororities). For NDSU employees, compliance with this policy is a term and condition of employment. For NDSU students and student organizations, compliance with this policy is a term and condition of continued enrollment/organizational registration. The complete and current policy may be viewed online.

## Campus Security

([www.ndsu.edu/ndsu/police/ndsu\\_personal\\_safety/index.htm](http://www.ndsu.edu/ndsu/police/ndsu_personal_safety/index.htm))

NDSU complies with the Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act. This law was renamed in 1998 and was formerly known as the Student Right-to-Know and Campus Security Act of 1990. Policies, prevention, services, and crime statistics are available at the Office of the Dean of Student Life, 368 Memorial Union; the NDSU Police Department, Thorson Maintenance Center; or online.

## Problems/Complaints

The Vice President for Student Affairs Office has established a procedure for students to file complaints, concerns or issues. The purpose of the procedure is to provide for an orderly collection of information, to address students' complaints in a timely manner by appropriate university personnel, and to help students learn effective conflict resolution skills.

A form is available in the Vice President for Student Affairs Office, 100 Old Main, or the Dean of Student Life Office, 368 Memorial Union, to assist students in stating the problem and the desired problem resolution. In addition, students may arrange a meeting with the Associate Director of Student Rights and Responsibilities, 368 Memorial Union, at any time during the process for advice and direction in resolving the problem.

## Enrollment Information

### Admission ([www.ndsu.edu/prospective\\_students](http://www.ndsu.edu/prospective_students))

#### Campus Visits

Anyone interested in attending NDSU as an undergraduate student should contact the Office of Admission, 124 Ceres Hall, for application procedures and information. Office of Admission staff welcome and encourage inquiries about NDSU student life and academic programs. Campus visits are scheduled weekdays for prospective students and families. Such visits may include a campus tour, appointment with a faculty member in the student's area of interest, and an interview with an admission representative. Simply call the NDSU Campus Visit Coordinator at 1-800-488-NDSU or 231-8643.

**Admission Policies**

Admission policies and practices reflect the university's commitment to equal opportunity.

**Admission of Freshmen**

In compliance with State Board of Higher Education policy, students are selected on the basis of high school core course requirements, ACT or SAT scores, and grades.

**Academic Eligibility**

A prospective student must complete the following high school core curriculum unit requirements (one unit equals one full year of study):

1. Four (4) units of English
2. Three (3) units of mathematics (at the level of algebra I and above)
3. Three (3) units of laboratory science
4. Three (3) units of social studies

**Application Requirements**

To be considered for freshman admission, submit the following:

1. A completed application for admission and a \$35 nonrefundable application fee.
2. An official transcript of all high school credits sent by the high school; official transcript(s) of any subsequent postsecondary course work.
3. Scores from the American College Test (ACT) (NDSU's code number is 3202) or from the Scholastic Aptitude Test (SAT) (code number is 6474), if applicant is under 25 years of age.

Admission decisions are based on the total high school record. Completion of the core curriculum requirements previously listed does not automatically guarantee admission to NDSU. In addition to fulfilling the core requirements, grade-point average in the core courses, and ACT or SAT scores are considered in evaluating an application. The general guidelines used in making admission decisions include a cumulative high school grade-point average of 2.5 (4.0 scale) and an ACT composite score of 21 or an SAT score of 970 or higher. Students who do not meet these guidelines will be considered if other supporting factors show potential for success.

**Note:** North Dakota State Board of Higher Education requires verification of measles, mumps, and rubella immunizations for all students born after December 31, 1956.

**Admission of Transfer Students**

Refer to the section on Academic Policies for information on evaluation of transfer credits. Students who have previously attended NDSU should refer to the section on readmission of returning students.

**Application Procedures**

Students interested in transferring to NDSU must present the following to be considered for admission:

1. Completed application for admission and a \$35 nonrefundable application fee.
2. Official high school transcript, complete with graduation date, if fewer than 60 semester credits (90 quarter credits) of transferable college work have been completed.
3. Minimum cumulative college grade-point average of 2.00 on a 4.00 scale.
4. Official transcripts from all colleges previously attended. Transfer students are not at liberty to disregard any part of their previous college record. Failure to report all college and university work attempted may result in dismissal or loss of credit or both.
5. An ACT or SAT score is required unless applicant:
  - a. Is 25 years of age or older on the first day of class;
  - b. Has completed 24 semester (36 quarter) credits of college work;
  - c. Has military service (Exemptions granted on a case-by-case basis.).

The Office of Registration and Records administers the NDSU policies governing the acceptance of credit from outside institutions. Before credits may be evaluated for specific NDSU course equivalence or application to a departmental program, transfer courses must be accepted for university credit. Transfer credits are evaluated as soon as possible after final and official transcripts from each institution have been received. Refer to the section on Academic Policies for evaluation of transfer credits.

**Note:** Students who have been suspended from another institution may not be considered for admission to NDSU until the suspension has been lifted by that institution or until one year has elapsed.

**Supplemental Applications**

In addition to completing the preceding procedures, several academic departments require a supplemental application for transfer students seeking admission to the professional-level programs:

**Admission of Early-Entry Students**

High school juniors and seniors wishing to take course work at NDSU prior to high school graduation may enroll as an early-entry student. Submit all of the following:

1. Completed application for admission and a \$35 nonrefundable application fee.
2. High school transcript.
3. Early-entry permission form signed by a parent or guardian and by a high school counselor or principal.
4. Students seeking early-entry status must show evidence of strong academic ability and adequate progress toward meeting the core curriculum requirements. Credit earned will be made official upon receipt of the final high school transcript.
5. College credit may apply toward high school graduation requirements. Students should consult their high school policy regarding this issue and must initiate the Dual Credit Enrollment Application with the high school counselor.

**Note:** A cumulative grade-point average of 3.5 is recommended; however, each application will be reviewed on an individual basis.

**Admission of Non-Degree Seeking Students**

Special student status is reserved for non-degree seeking students who have already obtained a high school diploma or GED and wish to enroll in a limited number of courses at NDSU. Special students are permitted to register for up to 15 credits without submitting official transcripts (unless college course work was attempted within one year prior to application). Interested students should request and submit a Special Student Status Application from the Office of Admission and a \$35 nonrefundable application fee. If students wish to take additional courses or become degree-seeking, appropriate high school and/or college transcripts must be submitted to be considered for admission.

Students currently enrolled at another college or university and planning to take limited course work at NDSU with intention of transferring NDSU credits to their home institution should follow application procedures for special student status.

**Admission by Examination (GED)**

Persons 19 years of age or older may substitute satisfactory scores on the General Education Development (GED) tests in place of a high school diploma. North Dakota residents may take these tests by appointment at the Counseling and Disability Services Office or at high schools throughout the state. Others should consult with schools in their home state for details about testing centers.

Students who present an overall average score of 450 on the GED with no subject score lower than 410 will be considered for admission to the university. ACT/SAT scores are required if applicant is under 25 years of age.

**Admission of International Students**

([www.ndsu.edu/International](http://www.ndsu.edu/International))

Admission of undergraduate international students is determined by a selective admission process that includes consideration of English language proficiency, academic achievement, and financial resources. For information specific to graduate students, refer to the Graduate School website or contact The Graduate School.

**International Student Deadlines**

Deadlines for international applications are May 1 for Fall Semester and October 1 for Spring Semester. For an application to be processed, it must be accompanied by a nonrefundable application fee of \$35 U.S. submitted in the form of a check (postal or money order) drawn on a U.S. bank and payable to North Dakota State University.

**English Language Proficiency**

Scores from the Test of English as a Foreign Language (TOEFL) must be submitted by prospective international students at the time of application. The minimum required TOEFL score for unconditional acceptance is 525 (paper test); 193 (computer test); or 70 (Internet test). Undergraduate students receiving scores between 460-524 (paper test); 140-190 (computer test); or 48-69 (Internet test) and graduate students with scores between 500-524 (paper test); 173-190 (computer test); or 61-69 (Internet test) may receive conditional acceptance with attendance at NDSU's Intensive English Language Program required (see section on Intensive English Language Program). Arrangements to take the TOEFL may be made by visiting the website at [www.toefl.org](http://www.toefl.org) or by inquiring at the nearest U.S. Consulate or binational center. Applicants should have their scores sent directly from ETS to the Office of International Programs, North Dakota State University, P.O. Box 5582, Fargo, North Dakota 58105, U.S.A. Test results that are more than two years old will not be considered.

**Academic Achievement**

Applicants are required to furnish an original or school certified copy of an official academic record from all secondary schools and all colleges, universities, and professional schools attended. (See Certification of Credentials from Abroad.) The



academic record must show all marks or grades received in each subject for each school year and any certificates, diplomas, or degrees awarded, including all subjects passed and grades or marks earned on government or university examinations. If the academic record is not in English, a certified literal translation must be sent in addition to the official record.

Students applying directly from their home countries who have not completed any course work in the U.S. should rank in the upper third of their class or have the equivalent to a B average in the U.S. Other factors, such as personal recommendations and test results, for example, scores on the Scholastic Aptitude Test (SAT) also will be considered, but are not required. Additional requirements for selective admission programs are outlined in the appropriate college section in this bulletin.

#### **Financial Resources**

Certification of adequate financial support is required from all international undergraduate applicants other than permanent residents of the U.S., parolees, refugees, U.S. trust territory applicants, or immigrants. Admission will not be granted until proof of funds for the duration of study has been submitted. A special North Dakota State University International Student Financial Certification Form must be completed for this purpose. Failure to complete this certification and submit supporting documents will delay admission decisions and the issuance of the appropriate immigration forms. Applicants must be prepared to pay tuition and fees, as well as costs for living expenses, for their entire stay at the university. A detailed summary of expenses is included in the international application packet. Each student should become familiar with his/her financial needs based on that summary.

#### **Health Insurance**

All international students are required to purchase the health insurance policy specified by the state of North Dakota. No other policy may be substituted. The fee for health insurance for one year must be paid upon arrival and at the beginning of each subsequent year. In addition, the state of North Dakota requires proof of immunity to measles, mumps, and rubella prior to registration for courses. Tuberculosis (TB) screening is required prior to registering for classes for students living in or who have arrived within the past five years from countries where TB is endemic.

#### **Transfer of Funds**

Before departing for the United States, students should become thoroughly familiar with their home government's regulation for exchanging and forwarding money. Transfer International Students

Undergraduate students transferring from U.S. colleges or universities should have a cumulative grade-point average of 2.5 or higher on a 4.0 scale, except for applicants to selective programs, such as engineering, which require higher minimum grade-point averages. Admission decisions are based on academic course work, as well as on the capability of the university to accommodate additional international students. Applications from students already studying in the U.S. are considered if their file is complete by June 15 for Fall Semester and November 1 for Spring Semester. Any academic course work accepted for transfer by the university is subject to departmental approval. Evaluation of transfer credits normally will not be completed until the applicant has arrived on campus and enrolled. If key criteria needed to determine NDSU equivalent credits are missing from the transcript, a professional evaluation may be required in order for transfer credit to be granted. Applicants seeking transfer credits for higher education work completed outside the United States should bring with them a detailed syllabus for each course. A student must be able to provide a full description of prior course work to his/her academic advisor to facilitate the evaluation of transfer credits. All international students currently studying in the United States must submit the Transfer Information Form as part of the application. This form is to be completed by the applicant and the applicant's present or most recent international student advisor.

#### **Certification of Credentials from Abroad**

The appropriate school authority that issued the original academic record should make a photocopy of the applicants' papers and certify that it is a true copy by placing the institution's stamp or seal and the official's signature on the photocopy. Copies of transcripts issued by one institution but certified by another institution will not be accepted from abroad. Students presently attending a college or university in the United States may have the admissions officer at their current institution send certified copies of their foreign academic records to North Dakota State University if the records were originally certified by the appropriate institutions. University work completed at one institution but listed on the record of a second institution will not be considered without a separate record from the institution where the work was originally completed.

#### **Intensive English Language Program**

An Intensive English Language Program is offered year round and is open to international visitors and graduate and undergraduate applicants who plan to enroll at North Dakota State University. The course is designed for individuals whose scores on the Test of English as a Foreign Language (TOEFL) do not meet minimum standards and who are required to participate as a condition of admission to the

university or as a condition of being awarded a teaching assistantship. The full-time, intensive course is offered every summer for five weeks and fall and spring for 15 weeks. No college credit is given and students attend at their own expense.

For more information, contact the Office of International Programs, P.O. Box 5582, Fargo, North Dakota 58105-5582 U.S.A., telephone: 231-7895, fax: 231-1014, e-mail: [ndsu.international@ndsu.edu](mailto:ndsu.international@ndsu.edu) or visit the Web site.

## **Admission of Graduate Students**

([www.ndsu.edu/gradschool](http://www.ndsu.edu/gradschool))

For admission requirements to graduate programs, refer to the bulletin section for the College of Graduate and Interdisciplinary Studies or call 231-7033.

## **Readmission of Returning Students**

Returning students are those who have previously attended NDSU and are returning after an absence of at least one full term, exclusive of the summer session. Returning undergraduate students should contact the Office of Registration and Records (not the Office of Admission) at least 30 days prior to their expected return so that records might be updated to permit further registration. (Returning graduate students should contact the Graduate School for readmission information.) Students who have enrolled in courses at another institution since leaving NDSU must arrange for an official transcript to be sent to the Office of Registration and Records, PO Box 5196, Fargo, ND 58105. Reactivation forms may be acquired online at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar). Failure to list all colleges, universities, and schools attended while away from NDSU may result in denial of readmission, rescission of admission, dismissal, loss of credit(s), or other appropriate sanctions.

Students who left NDSU following an academic suspension must petition for readmission. Forms may be acquired online at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar) and are to be submitted to the Office of Registration and Records, 110 Ceres Hall, at least 30 days prior to the semester start date.

## **Selective and Limited Admission Programs**

Admission to a number of programs is selective and/or limited, and admission to the university does not guarantee entrance to a specific major. Supplemental applications may be required for students seeking admission to the professional-level programs. Contact the respective department for further admission criteria and application deadlines for the following programs:

- Accountancy
- Accounting
- Agricultural Communication
- Architecture
- Athletic Training
- Business Administration
- Clinical Laboratory Science
- Computer Engineering
- Dietetics
- Electrical Engineering
- Environmental Design
- Health Communication
- Human Performance and Fitness
- Industrial Engineering and Management
- Interior Design
- International Studies
- Journalism, Broadcasting and Mass Communication Technology
- Landscape Architecture
- Management Communication
- Management Information Systems
- Manufacturing Engineering
- Mechanical Engineering
- Music
- Nursing
- Pharmacy
- Public Relations and Advertising
- Radiologic Sciences
- Respiratory Care
- Sport and Recreation Studies
- Teacher Education (all programs)
- Veterinary Technology

## **Orientation and Student Success**

([www.ndsu.edu/student\\_success](http://www.ndsu.edu/student_success))

The Office of Orientation and Student Success works to help new and returning students experience success through academic and personal growth. Orientation and Student Success staff provide New Student Orientation programs for freshman and transfer students and their families. Staff members also coordinate academic tutoring (ACE) and peer advising/mentoring programs in collaboration with academic colleges and offices throughout the university.

Orientation and Student Success also strives to educate students and parents about risks associated with alcohol use, communicate clear messages about the consequences of underage drinking, and provide on-campus late-night activities. In addition, staff conduct retention related research, develop services focusing on at-risk students, and provide support for the Skills for Academic Success Course.

## Student Financial Information and Services

Fees for specific programs, which have been approved by the North Dakota Board of Higher Education, include the following. (Total credit hours include transfer credits.)

Program	When the fee will be assessed	2006-07 fee amount
<b>Architecture &amp; Landscape Architecture</b>	Students who have been accepted into the second-year design studio	33% of ND tuition rates (\$65.64/cr capped at 12 crs or \$787.70/sem
<b>Athletic Training</b>	Students accepted into the program	\$500/sem –Master's \$250/sem –Undergrad
<b>Coordinated Program in Dietetics (CPD)</b>	Students who have completed 60 or more total credit hours	\$600/semester
<b>Didactic Program in Dietetics (DPD)</b>	Students who have completed 60 or more total credit hours	\$175/semester
<b>Education</b>	Students accepted into 400-level classes	\$875 one-time fee
<b>Engineering</b>	All full-time and part-time students	\$27.33/cr capped at 12 credits or \$328/semester
<b>Health Educ &amp; Physical Educ</b>	Students accepted into the second-year curriculum	\$285/semester
<b>Human Perform &amp; Fitness</b>	Students accepted into the second-year curriculum	\$285/semester
<b>Interior Design</b>	Students who have passed their sophomore review	\$250/semester
<b>Marriage &amp; Family Therapy (grad program)</b>	Students accepted into the program	\$250/semester
<b>Nursing</b>	Students accepted into the professional program after completion of the pre-nursing curriculum	\$300/semester
<b>Pharmacy</b>	Students formally accepted into the professional Pharm.D. program	Equal to ND tuition rate \$2,387/semester)
<b>Recreation Management</b>	Students accepted into the second-year curriculum	\$285/semester

### Approximate Undergraduate Costs to Attend NDSU, 2006-2007

	ND resident	MN resident	Contiguous states	
			WICHE/WUE/MHEC NDUS Alumni Dependent <sup>1</sup>	Other non residents
	per semester/ per year	per semester/ per year	per semester/ per year	per semester per year
<b>Expenditures</b>				
Tuition (12 or more credits per semester) <sup>2</sup>	\$2,387/ \$4,774	\$2,604/ \$5,208	\$3,581/ \$7,161	\$6,374/ \$12,747
Student fees <sup>2</sup>	\$474/\$948	\$474/\$948	\$474/\$948	\$474/\$948
Room and board <sup>3</sup>	\$2,852/ \$5,477	\$2,852/ \$5,477	\$2,852/ \$5,477	\$2,852/ \$5,477
Books and supplies	\$350/\$700	\$350/\$700	\$350/\$700	\$350/\$700
Total semester <sup>4</sup>	\$6,063	\$6,280	\$7,257	\$10,050
<b>Total year<sup>4</sup></b>	<b>\$11,899</b>	<b>\$12,333</b>	<b>\$14,286</b>	<b>\$19,872</b>

<sup>1</sup> Contiguous Provinces: Manitoba, Saskatchewan. WICHE/WUE States: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, and Wyoming. MHEC States: Kansas, Michigan, Missouri, Nebraska, and Wisconsin. University System alumni include legal dependents and spouse.

<sup>2</sup> Students carrying fewer than 12 credits per semester will pay their tuition and required fees on a prorated basis.

<sup>3</sup> Room and Board cost shown is based on a double room and 20-meal plan. A student in a double room with the 15-meal plan would pay \$2,654 fall semester and \$5,081 per year.

<sup>4</sup> In addition to the listed costs, students should plan approximated costs of \$1,300 per semester and \$2,600 per year for personal expenses and transportation.

Current tuition rates and required fees are available on the Business Office Web site. This Web site also contains additional items including payment information, withdrawal information, and important dates and deadlines.

The following is a list of additional charges beyond tuition:

### Distance and Continuing Education Tuition and Fees

Courses offered through Distance and Continuing Education are billed at the North Dakota residency rates. These courses are not covered under the tuition cap and are not eligible for NDSU tuition waivers.

### Self-Support Tuition

Courses labeled as Self-Support are not supported through state appropriated dollars and only are offered summer semester. These courses are not covered under the tuition cap and are not eligible or NDSU tuition waivers.

### Student Fees

Required student fees have been approved by the student body and are charged each term. The maximum charge for the fall and spring semesters is based on 12 credits and the maximum charge for the summer semester is based on 9 credits. The maximum 12 credit rate for the 2006-2007 school year is \$473.86. The breakdown of student fees per credit consists of the following:

Activity Fee	\$10.50
Union Bond	3.25
Career Services	\$1.08
Technology Fee	\$6.88
Health/Wellness Fee	\$10.17
ConnectND	\$6.75
ND Student Association	\$.03
Library Fee	\$.83
<b>Total per credit</b>	<b>\$39.49</b>

### Residence Halls

Base rate for a residence hall room is \$1,252 for Fall 2006 and \$1,025 for Spring 2007. A hall dues fee of \$75 is assessed each semester. \$50 application fee/deposit is required and will be applied against the room charge. Additional charges also may apply.

### Apartments

Apartment rates may be found on the Residence Life Web site. A \$200 application fee/deposit is required and will be applied against the initial rental payment.

### Meal Plans

The following meal plans are available for the 2006-2007 school year:

20 Meal Plan	\$1,600/per semester
15 Meal Plan	\$1,402/per semester
10 Meal Plan	\$1,250/per semester

### Course and Class Fees

Courses or classes that have additional fees will have the amount listed in the Class Notes of the Class Sections Detail on Campus Connection.

### Other Charges

**Application Fee** – The application fee of \$35 is non-refundable and must accompany the admission application.

**Course Audit** – The course audit (not for credit) fee is 50% of the North Dakota tuition rate.

**Course Challenge** – Course challenge fee is 50% of the North Dakota tuition rate. The fee is paid after approval of the petition to challenge, but before the special examination is administered.

**Interactive Video Networking (IVN) Fee** – The IVN fee is 20% of the North Dakota tuition rate. This fee is assessed to classes taken at non-Fargo locations through the use of IVN.

**Matriculation Fee** – The matriculation fee of \$45 is a non-refundable fee for all new students to provide orientation programs, tutoring and retention-related activities.

**Parking Permits** – NDSU employees and students are assessed \$110 for the school year to park in university lots. For further information, contact the Parking Office at 231-5771.

**Photo ID (Bison Card)** – All students are required to have an NDSU photo identification card. The purchase of new Bison Cards or replacement of lost cards is \$15.

**Special Examinations** – NDSU serves as a national testing center. Fees vary for different placement and proficiency testing programs. For specific fee information, contact the Counseling Center and Disability Services at 231-7671.

**Student Health Service Fees** – Payment of student fees entitles a student to the basic services of the Student Health Services at the Wellness Center. Additional fees are charged for laboratory services, medications, and clinical/medical treatments.

**Refund of Tuition and Fees**

Refund calculations for class drops or withdrawals from the university are calculated in accordance with the North Dakota Board of Higher Education policy 830.2. Detailed information on refunds for drops and withdrawals is available on the Business Office Web site [www.ndsu.edu/business\\_office](http://www.ndsu.edu/business_office).

**Class Drops**

A student who drops a class before the class is 9% complete is entitled to a 100% refund of tuition and fees. A refund will not be issued for classes dropped on or after 9% completion.

**Withdrawals to Zero Credits**

When a student wishes to discontinue enrollment from all classes and will not be receiving credit for any class(es) within that semester, the student needs to complete the withdrawal process at the Business Office in Room 101, Old Main. The Withdrawing to Zero Credits Form may be found on the Business Office Web site. Once a withdrawal is processed, the student cannot re-enroll for that semester. However, the student may still enroll in subsequent semesters.

Refunds resulting from a withdrawal are calculated on each individual class's completion percentage. Each class could have a different refund percentage. Upon withdrawal from the semester, classes are refunded based on the following schedule:

<b>Class Percent Completed</b>	<b>Percent Refunded</b>
0.000%-8.99% . . . . .	100%
9.000%-34.999% . . . . .	75%
35.000%-59.999% . . . . .	50%
60.000%-100.000% . . . . .	0%

**Class Length Calculation**

The class length calculation is based on the start and end dates of the class as listed in Campus Connection, and includes all calendar days (including weekends and holidays), not just class days.

**Residency and Tuition Reciprocity**

The North Dakota Century Code, Section 15- 10-19.1, governs determination of residency for tuition purposes.

**Resident Guidelines**

A North Dakota resident student, for tuition purposes, is defined as follows:

1. A person whose guardian, custodial parent, or parents are legal residents of this state and have resided in this state for 12 months, or a dependent child whose custodial parent moved into the state with the intent to establish legal residency for a period of years within the last 12 months immediately prior to the beginning of the academic term;
2. A person of age 18 or older who is a legal resident of this state and has resided in this state after reaching age 18 for 12 months immediately prior to the beginning of the academic term;
3. A person who graduated from a North Dakota high school;
4. A full-time active duty member of the armed forces assigned to a military installation in this state or a member of a North Dakota national guard unit;
5. A spouse or dependent of a full-time active duty member of the armed forces assigned to a military installation in this state or a member of a North Dakota national guard unit;
6. A spouse or dependent of an employee of any institution of higher education in this state;
7. A spouse of a resident for tuition purposes;
8. A person who was a legal resident of this state for at least three consecutive years within six years of the beginning of the academic term, or
9. A child, spouse, widow, or widower of a veteran who was killed in action or died from wounds or other service-connected causes, was totally disabled as a result of service-connected causes, died from service-connected disabilities, was a prisoner of war, or was declared missing in action.

**Note:** "Dependent" means only a person claimed as a dependent on the most recent federal tax return.

\*The application for resident student status can be found at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar) (click on "forms" link). The application is due prior to the start of the academic term that the student is applying for resident tuition status.

**Minnesota Tuition Reciprocity**

Effective September 1975, the states of Minnesota and North Dakota enacted a tuition reciprocity agreement. This means that legal residents of the State of Minnesota may qualify for reduced tuition at North Dakota State University.

Minnesota residents who enroll at NDSU within 12 months of their graduation from a high school in Minnesota need not apply for reciprocity.

All other Minnesota residents should apply for reciprocity at the following Web address: [www.getreadyforcollege.org](http://www.getreadyforcollege.org). Questions may be directed to:

Minnesota Office of Higher Education  
1450 Energy Park Drive, Suite 350  
St. Paul, MN 55108-5227  
1-800-657-3866 or 1-651-642-0567

Once reciprocity has been granted by the State of Minnesota, students should print a confirmation letter from the Web site and submit it to the NDSU Office of Registration and Records, 110 Ceres. Tuition will be reduced accordingly.

Residency issues must be resolved by the last day of classes of the first session the student attends. Refunds will not be processed retroactively.

Note: Returning students who have previously filed for tuition reciprocity but have not enrolled in a course or earned credit at NDSU during the past academic year need to re-file.

**Reduced tuition for WICHE/WUE/MHEC/Contiguous students**

Legal residents of states that participate in one of the following programs or who reside in a contiguous Canadian province also are eligible for reduced tuition at NDSU.

**Western Interstate Commission for Higher Education (WICHE)/Western Undergraduate Exchange (WUE):**

- Alaska
- Colorado
- Hawaii
- Idaho
- Montana
- New Mexico
- Nevada
- Oregon
- South Dakota
- Utah
- Wyoming
- Arizona (for students who enter on or after Fall 1998)
- California (for students who enter on or after Fall 1998)
- Washington (for students who enter on or after Fall 1998)

**Midwest Higher Education Compact MHEC):**

- Kansas
- Michigan
- Missouri
- Nebraska
- Wisconsin
- Contiguous provinces:
- Manitoba
- Saskatchewan

**VA Educational Benefits**

Students eligible for VA educational benefits, including Montgomery G.I. Bill, Vocational Rehabilitation, and dependent educational benefits should contact the Office of Registration and Records, 110 Ceres, 231-7985.

**Financial Aid ([www.ndsu.edu/finaid](http://www.ndsu.edu/finaid))**

Students attending NDSU for the first time must apply for admission to be considered for financial aid.

All aid applicants will be expected to complete and submit the Free Application for Federal Student Assistance (FAFSA). To be considered for the maximum number of financial aid sources, the FAFSA must be processed by the FAFSA processing agency on or before March 15. To ensure meeting this deadline, the completed FAFSA should be mailed in February.

Students are encouraged to complete the FAFSA online at [www.FAFSA.ed.gov](http://www.FAFSA.ed.gov). Official financial aid award notices are mailed to students the in June.

**Federal Pell Grants**

All students who have not yet earned a baccalaureate degree are eligible to apply for grant assistance under this program. Grant amounts ranging from \$400 to \$4,050 per year are awarded to students with exceptional need for assistance.

Federal Supplemental Educational Opportunity Grants  
These federal grants are awarded to undergraduate students with exceptional need for assistance (Pell Grant recipients must be given priority in the awarding of Supplemental Grants). Amounts range from \$300 to \$1,400 per year.

**State Grants**

North Dakota residents may be considered for a \$600 State Grant by completing the FAFSA. Eligibility is based upon need for assistance. Early submission of the FAFSA will ensure priority consideration for the grant.

## Loans

The university participates in the Federal Perkins and Stafford Student Loan Programs. The Minnesota Student Educational Loan Fund (SELF) and Parent Loans for Undergraduate Students (PLUS) programs are available to qualified applicants. There are several other loan options available through various lenders.

Rates of interest are below those charged commercially, and borrowers may have up to 10 years after leaving school to repay these loans depending upon the total amount borrowed.

The Office of Student Financial Services also offers short-term emergency loans of nominal amounts to qualified enrolled students.

## Withdrawals and Cancellations

Prior to the start of a semester students can cancel their registration by contacting the Office of Registration and Records, 110 Ceres Hall. Upon cancellation of registration, all financial aid funds are forfeited. Withdrawals to zero credits on or after the start of a semester are processed in the Business Office, 101 Old Main. Institutional refunds are calculated based upon a declining percentage extending through the 60% point of the term. Specific dates and refund percentages are published in the "Registration Schedule" each term.

A recipient of Title IV grant or loan funds who withdraws prior to the 60% point of the term and has attended at least one class must have their aid eligibility recalculated to determine the amount of aid earned. The recalculation is based on the number of days in the term and the number of days completed by the student.

A student who does not officially withdraw to zero credits but ceases attendance in all classes prior to the 60% point of the term, is considered to be an unofficial withdrawal. No refund of institutional charges is made on an unofficial withdrawal; however, a recalculation of Title IV aid earned is required. The student's date of withdrawal will be either the last documented date of attendance or the 60% point of the term, whichever is later.

When the withdrawal date is determined, whether on an official or unofficial withdrawal, a Return of Title IV Funds Worksheet will be processed to calculate the institutional refund as well as the unearned Title IV financial aid funds. If aid has already been disbursed to the student, the unearned Title IV funds will be returned using the student's institutional refund of institutional charges. If the amount of the institutional refund is not enough to reimburse all of the unearned Title IV funds, the student is responsible for paying the balance. If aid has not been disbursed to the student, a post-withdrawal disbursement will be offered to the student, as long as the student is eligible for Federal Title IV assistance. A copy of the Return of Title IV Funds Worksheet will be given to the student at the time of withdrawal. In the event of an unofficial withdrawal, a certified letter will be sent to the student that includes the Return of Title IV Funds Worksheet.

A complete copy of the policy and procedures for withdrawals to zero credits is available upon request in the NDSU Office of Student Financial Services, 202 Ceres Hall.

## Academic Standards for Federal Financial Aid Eligibility

Students must meet standards of satisfactory academic progress to maintain their eligibility for Title IV financial assistance each year. These standards differ somewhat from the minimum standards set by the university. Changes in registration, such as dropping courses or withdrawing from all courses, may affect financial aid eligibility of applicants and recipients. For details or to obtain a copy of the "Standards of Satisfactory Academic Progress for Financial Aid Eligibility," contact the NDSU Office of Student Financial Services.

## Employment and Work Study

The federal Work-Study program provides jobs both on and off campus during the school year and summer for enrolled students with need for assistance. For non-work study employment, see the Career Center.

## Scholarships

High school seniors with superior academic credentials are encouraged to contact the NDSU Office of Admission for scholarship information and application forms. Returning and upperclass students should contact their college or department regarding scholarship availability and application procedures. Students should also seek out scholarships offered through non-university sources. Please see NDSU scholarship information online at [www.ndsu.edu/finaid](http://www.ndsu.edu/finaid).

# Student Programs and Services

Diverse services and reinforcement programs are available at NDSU. Each is aimed at enhancing student life by assisting students to gain the maximum benefit from their experiences.

## Career Center ([www.ndsu.edu/careercenter](http://www.ndsu.edu/careercenter))

The Career Center is a comprehensive resource center to assist NDSU students and alumni with their job searches and to connect them with employers.

There are three distinct areas of focus: career preparation, cooperative education, and part-time and summer work.

**Career preparation:** Students are assisted with the process of becoming successfully employed by utilizing the services and resources available to undergraduate and graduate students who are in their job searches.

**Part-time and summer work:** Students can utilize the electronic part-time job board to access on and off-campus job postings.

**Cooperative education:** This internship-type program blends classroom education with hands-on experience through career-related, paid work experiences for academic credit. Cooperative education offers specific benefits to students:

- Career related work experience
- An opportunity to explore a career field
- Earn money
- Receive academic credit

Participation in the co-op program may substantially improve students' employment opportunities after graduation by providing skill mastery to prospective employers.

The co-op program option is available in most academic departments. Freshmen should begin their career development process by meeting with Career Center staff. Generally, students are qualified to participate in the program during or after their sophomore year. Employment can be full or part-time and must consist of a minimum of 100 hours of work per semester to earn credit. Work experiences can occur during the school year or the summer.

Co-op assignments generate one to three credits on the student's transcript depending on the number of hours worked during the semester. There is a cap of 12 co-op credits per student. Cooperative Education registration is offered through Continuing Education and credit is awarded directly by the Co-op Program. Students must make their credit arrangements prior to their Co-op assignment.

**Other resources and services available at the Career Center include:**

- Instructional Web site
- Professional job search advisors focusing on resume and cover letter development; interview techniques and mock interviews; job search strategies; professional image instruction; federal job and internship information
- Employer recruiting and on-campus interviewing
- Career events including On-campus Job Fair–fall; Meet the Firms (Accounting)–fall; Engineering and Tech Expo–fall; Tri-College and Internship Fair–fall; Tri-College Graduate School Day–fall; Spring Career Fair–spring; Design Expo–spring; Summer Job Fair–spring; and the North Dakota Education Career Fair–spring.

## Counseling Center ([www.ndsu.edu/counseling](http://www.ndsu.edu/counseling))

The Counseling Center provides professionally trained counselors to assist students when they need academic, personal or career help. Students may experience problems that range from everyday concerns to those that are more serious; they will find counselors who can provide service and/or referral for a wide variety of concerns. Typical issues include career concerns, choice of major, difficulties with roommates or other relationships, depression, anxiety, eating disorders, alcohol and/or other drug abuse, and problems that relate with academic achievement. Individual and group counseling is offered without cost. Small group classes are offered by counseling staff members who teach one-credit, pass-fail classes in Career Planning (Educ 124), Study Skills (Educ123) and Assertiveness Training (Educ 125). These classes are offered each semester.

The Counseling Center is open for appointments from 8 a.m.-5 p.m. during the academic year and from

7:30 a.m.-4 pm. during the summer. There is a walk-in service for those who need immediate assistance. Other students can schedule an appointment at their convenience. Limited psychiatric care is available for a nominal charge. Referrals for this service are made by counseling staff.

Testing service also is available through the Counseling Center. Standardized tests (e.g., GED, ACT, Miller Analogies, PCAT, CLEP) are available. Specific information is available from the Testing Administrator at 231-6317 or at the website listed above.

Counseling services are confidential, free and open to NDSU students. The staff follows HIPAA policies and procedures and the Counseling Center is accredited by the International Association of Counseling Services, Inc.

## Disability Services

([www.ndsu.edu/counseling/disability.shtml](http://www.ndsu.edu/counseling/disability.shtml))

Disability Services (DS) provides accommodations for students with permanent physical, psychological or learning disabilities who have functional limitation in a major life activity. Professional staff in the DS office will determine eligibility, identify appropriate accommodations, provide referrals for tutoring, assistive technology, and other support services. Staff also will make referrals to the Counseling Center for academic, personal, and career concerns where necessary.

To receive accommodations, a student must self-disclose his/her disability and provide current documentation of the disability with the DS office. Accommodations are determined case by case based on the functional impact of the disability. Staff will work with the students and others in the campus community to implement the approved accommodations.

The goal of the DS program is to ensure access to educational opportunities for students with disabilities so they are able to fully participate in the university environment. Disability Services office hours are

8 a.m.-5 p.m. during the academic year and

7:30 a.m.-4 p.m. during the summer.

## Dining Services (<http://dining.ndsu.nodak.edu>)

Dining rooms are warm and conducive to socializing. The staff is energetic and caring. The staff's sincere intent is to make living and dining pleasant and to provide students with a variety of food products and services.

The dining facilities for the majority of students residing on campus are interconnected with adjacent residence halls, while students living near the center of the campus will find food facilities easily accessible within the Memorial Union. The noon meal will be the last meal served prior to the beginning of all holidays or recess periods.

Carryout meals will be prepared for those students unable to eat during the scheduled serving hours. A validated meal card or cash is required upon entering dining areas offering board meal plans. To make residence hall dining more desirable, minimum standards of dress are required. Shoes and shirts must be worn at all times.

Have a guest? All meal plans include 10 guest passes each semester. Guests also may enter the dining center by using Dining Dollars, Bison Bucks or cash.

Three meal plans are available — 20 meals, 15 meals or 10 meals — with all you can eat at every meal. Meal plan weeks begin with Monday breakfast and conclude with Sunday dinner. Programs entitle students to one meal per meal period. See Student Financial Information section for board rates.

To accommodate busy schedules, each meal plan includes \$50 Dining Dollars. This flexible appending account can be used in any NDSU Dining Services location. Use Dining Dollars for between meals, missed meals, or late night dining

**Note:** Meal Plans are nontransferable.

### Meal Plan for All Students Living Off Campus

#### The 10-Pack Meal Deal:

The 10-pack meal deal is great for flexibility. Meals are purchased in 10 meal increments (10, 20, 30). Older than average, graduate, sorority and fraternity members, or students living off campus preferring not to cook every meal at home will enjoy this convenience. This plan is available at all dining locations plus the noon luncheon prepared and served by the Quantity Foods Class, West Dining Center.

#### Features of the 10-Pack Meal Deal

**Flexibility:** Meals may be used anytime during the academic year of purchase and do not have to be used within a given meal period or week.

**Guest Meals:** Card holders may use any of their contract meals to cover the cost of a guest for a meal.

**Special Notes:** Unused meals are not refundable.

## Memorial Union ([www.ndsu.edu/memorial\\_union](http://www.ndsu.edu/memorial_union))

The Memorial Union serves as a center of social, recreational, educational, and cultural activity for the NDSU campus community. Lounges and meeting rooms provide places where students, staff, faculty, and guests come together to exchange ideas and information and interact informally, thereby adding to their educational experience in a way not available in the classroom. The Memorial Union program includes an art gallery, several permanent art collections, a full season of performing arts events, outdoor adventure trips, bowling and billiards, a series of non-credit short courses in special interest and skill building topics, a community service program, a leadership and recognition program, and a wide variety of events planned by the student program board, Campus Attractions.

Memorial Union staff members assist students with the development of their leadership and management skills through leadership training, workshops, and conferences, as well as involvement in student organizations, campus activities, community service projects, student government and university governance committees.

Services available in the Union include information services, bookstore, dining services, barbershop, poster and sign making, graphic services, video bulletin board, room and contact table rental, outdoor recreation equipment rental, locker rentals, ticket office, notary public, photocopying, check cashing, FAX service, and automatic teller banking services.

The Memorial Union was constructed and is operated with the use of non-appropriated funds. An advisory board comprised of students, faculty, staff, and alumni members serves in an advisory role in formation of policies and procedures. In

addition to use by students, the Union is available for faculty meetings, departmental meetings, and for professional conventions and conferences. Additional information regarding Memorial Union facilities, services and policies is available at the Memorial Union administrative offices.

## Residence Life ([www.ndsu.edu/reslife](http://www.ndsu.edu/reslife))

NDSU student living facilities and dining services are designed to extend the student's educational experience beyond the classroom.

### Residence Halls

The residence halls are an integral part of the college experience. In this environment students have opportunities to enhance their academic, social, and personal growth. Also, students who live on campus have been found to be more likely to persist in their education and earn higher grade-point averages than their off-campus peers.

**Residence hall programs.** Through the leadership of full-time residence hall directors and resident assistants, students are encouraged to get involved and enjoy a variety of educational, cultural, social, and recreational activities. Programs specifically designed to supplement classroom work include Faculty in Residence and SuperTutor.

**Accommodations.** NDSU has 13 residence halls that accommodate a total of 2,870 students. A smoke-free environment is provided in all residence halls where smoking is prohibited in all parts of each building.

**Licenses.** Only enrolled NDSU students may live in the residence halls. Licenses for residence hall accommodations are for the academic year. Special consideration will be given to the needs of students with a physical or health condition. Assignment priority is established according to the date the application and application fee are received.

**New student policy.** All students under 19 years of age on the first day of classes of fall or spring semesters are required to live on campus. Exceptions may be granted for students who will be living with their immediate family or relatives. Requests for this exception should be submitted two weeks prior to the start of the semester to Department of Residence Life (Auxiliary Enterprises Building, PO Box 5481, Fargo, ND 58105) and should include a letter from the student's parent or guardian indicating the student's intended off-campus address and with whom the student will be residing. Exceptions also may be granted for second semester students wishing to live in a fraternity or sorority house, according to guidelines available in the Department of Residence Life or the Student Activities Office.

#### Single Student Apartments

Single student apartments provide additional personal freedom, more privacy, fewer interruptions, and an opportunity to live in a community environment with common academic interests and goals. Two-bedroom furnished apartments are designed to accommodate two to four students per apartment. Students who have completed a minimum of 27 semester credit hours are eligible to apply. Assignment priority is established according to the date the application and deposit are received.

#### University Apartments

The advantages of living on campus in the university environment are available for eligible families. Family and graduate student housing is located on or near the university and is close to both private and public elementary schools. City parks, recreation areas, and shopping centers are conveniently located nearby. One and two-bedroom apartments are available to accommodate families at moderate rental costs. Assignment priority is established according to the date the application is received.

#### Housing Application

Students wishing to apply for campus housing should contact the Department of Residence Life. Assignment priority is established according to the date that the application and deposit are received. The demand for on-campus housing usually exceeds available space, so apply early. For current rates or more information contact the Department of Residence Life, North Dakota State University, P.O. Box 5481, Fargo, ND 58105-5481.

## Student Activities ([www.ndsu.edu/memorial\\_union](http://www.ndsu.edu/memorial_union))

Participation in student activities is encouraged at NDSU because of the contribution it makes to the total educational experience of the student. Research has shown that involved students balance their courses while enjoying a greater level of satisfaction during their college years. All student organizations and involvement opportunities are listed on the Memorial Union Web site.

The Student Activities Office is home to many popular involvement opportunities such as Lively Arts Series, Volunteer Network, Greek Life, Art Gallery, and the ever-growing leadership development program series. Come visit us today. We can help build your leadership skills, resume and so much more.

To help summarize the skills students develop through their campus life involvement, an official document called the Student Involvement Transcript is available. For information, contact the Student Activities Office, Memorial Union, 231-7787.

## Student Government and Organizations

Student participation in university affairs is coordinated by Student Government. The executive branch is represented by a president and vice president, a commissioner of student organizations, a commissioner of government relations, a commissioner of finance, a commissioner of public relations, a commissioner of academic and student affairs, and an administrative assistant. The Student Senate and the Student Court comprise the legislative and judicial branches. This government coordinates student-faculty committee appointments, and officially recognizes about 200 semi-autonomous student organizations in various categories: academic, governing and advisory, Greek, honorary, intercultural, leisure learning, military, performing and visual arts, recreational/competitive, religious, service, special interest, and spirit. Student government also maintains a relationship with councils of independently governed groups (Residence Hall Association, Interfraternity Council, Panhellenic Council, and the Family Student Association). Student senators also serve on University Senate committees. Other students are appointed by the student body president to joint administrative committees. Official recognition is granted to student organizations upon university acceptance of a recommendation from the Student Senate. Student organizational campus activities are financed by a student activity fee, which is administered primarily through the Student Finance Commission. Additional information may be obtained through the Student Activities Office, 360 Memorial Union.

## Fraternities and Sororities

Fraternities and sororities, often called Greeks because of the use of Greek letters in their organizational names, contribute to the educational process at NDSU. Greeks encourage participation by members in academic, community service, leadership, and social-oriented activities on campus and in the community. Fraternity and sorority membership provides opportunities for individuals to develop their leadership, communication, conflict resolution, organization, collaboration, and management skills that contribute to one's educational and career plans. In addition, Greek membership fosters an environment for developing life-long friendships. Some fraternities and sororities are geared toward individuals with specific academic interests to promote professional competency and achievement within their specific fields.

### Fraternities

- Alpha Gamma Rho (agriculture)
- Alpha Tau Omega
- Delta Upsilon
- FarmHouse
- Kappa Psi (pharmacy, professional)
- Sigma Alpha Epsilon
- Sigma Chi
- Sigma Nu
- Sigma Phi Delta (engineering and architecture)
- Tau Kappa Epsilon
- Theta Chi

### Sororities

- Alpha Gamma Delta
- Ceres (agriculture interest)
- Kappa Alpha Theta
- Kappa Delta
- Honor Societies

Several **honor societies** are well established at NDSU and encourage superior scholarship in various special fields:

- Alpha Epsilon (agricultural engineering)
- Beta Gamma Sigma (business)
- Blue Key (student leadership and service)
- Gamma Sigma Delta (agriculture)
- Golden Key (student leadership, service, and scholarship)
- Lambda Pi Eta (communication)
- Libra (sophomore scholarship)
- Mortar Board (student leadership and service)
- National Residence Hall Honorary (leadership in residence halls)
- Order of Omega (Greek leadership and service)
- Phil Alpha Theta (history)
- Phi Eta Sigma (freshman scholarship)
- Phi Kappa Phi (all academic fields)
- Phi Sigma (biology)
- Phi Upsilon Omicron (human development and education)
- Pi Kappa Delta (forensics)
- Pi Sigma Alpha (political science)
- Pi Tau Sigma (mechanical engineering)
- Psi Chi (psychology)

- Rho Chi (pharmacy)
- Rho Lambda (leadership in social sororities)
- Sigma Theta Tau (nursing)
- Tau Beta Pi (engineering)
- Tau Sigma Delta (architecture)
- Tri-College Hugh O'Brian Leadership Club (public service and leadership)
- Upsilon Pi Epsilon (computer science)

## Athletics ([www.GoBison.com](http://www.GoBison.com))

NDSU has reclassified its athletics program as a Division I member of the National Collegiate Athletic Association. The football program competes in the Division I-AA Great West Football Conference, which is comprised of California Polytechnic State University, University of California-Davis, North Dakota State University, South Dakota State University, and Southern Utah University. The soccer program is a member of the United Soccer Conference.

In addition to football, varsity competition for men includes basketball, baseball, cross country, golf, indoor track and field, outdoor track and field and wrestling.

Opportunities for women's varsity competition include basketball, cross country, golf, indoor track and field, outdoor track and field, soccer, softball and volleyball. Excellence is a goal of the university and athletics is no exception. As the athletics program transitions to Division I, its vision, "Continuing the Championship Tradition of Bison Athletics" prevails as the cornerstone of its future.

## Campus Recreation/Intramural Sports

The Campus Recreation/Intramural Sports (CR/IM) department organizes and promotes formal and informal recreational activities for the enjoyment of all NDSU students, faculty, and staff. The goal of the department is to provide a wide array of opportunities utilizing university recreational facilities. In addition to the informal open recreation program with facilities open more than 20 hours per week, a comprehensive intramural sports program is provided.

## Varsity Mart ([www.ndsuvarsitymart.com](http://www.ndsuvarsitymart.com))

The Varsity Mart Bookstore, owned and operated by NDSU, is located at the south entrance of the Memorial Union. The Varsity Mart is the official source of all required textbooks, supplies, apparel, and gifts for students, faculty, staff, and the general public. NDSU's convenience store, the Korner Mart, stocks such items as snacks, beverages, health and beauty aids and more. The computer department carries educationally priced hardware and software for students, faculty, and staff. In addition, the Varsity Mart sells stamps, phone cards, gift cards, and graduation attire.

## Wellness Center ([www.ndsu.edu/wellness](http://www.ndsu.edu/wellness))

Funded by the student health and wellness fee, the Wellness Center houses four major components: Student Health Service, Fitness Programs, Wellness Education, and Child Care Service. These four components work together to promote and develop healthy lifestyle opportunities for members of the university community.

**Student Health Service** is a primary health care facility offering integrated professional services to NDSU students. Registered nurses, certified nurse practitioners, physician assistants, and physicians staff the Student Health Service. The primary health services available include health promotion and disease prevention, health counseling, care during acute and chronic phases of illness, and referrals to outside providers when appropriate. Medical laboratory and pharmacy services are also available.

**Fitness Programs** provides activity areas where students, faculty, and staff can meet to address their strength and cardio conditioning needs. This area contains cardiovascular and strength equipment, an indoor track, and group exercise studio. Staff and student fitness specialists are available to conduct orientation classes, specialized training, and fitness testing.

An expansion to the Wellness Center was approved by the student body in April 2003 and will include additional cardio and strength space and equipment, basketball/volleyball courts, racquetball courts, climbing wall, martial arts studio, additional group exercise studio, suspended running track, and the relocation and expansion of the campus intramural program. The expansion will open for student, faculty, and staff use in the fall of 2007.

**Wellness Education** services and programs support all dimensions of wellness, including physical, social, environmental, occupational, intellectual, emotional, and spiritual. Services include health education, nutrition counseling and education, massage therapy, and wellness resources. Student Wellness Education Leaders promote wellness through peer education by increasing awareness of student health issues and encouraging positive lifestyle choices and decision-making skills.

The **Child Care** is a licensed service provided to NDSU students, faculty, and staff on a first-come, first-served basis. Parents may drop off children ages six weeks to six years for up to four hours while participating in campus activities. The Child Care Service is primarily drop-off, but limited full- and part-time contracted care also is available. An hourly fee is assessed to patrons of the Child Care Service.

# Special Instructional and Support Opportunities

## Center for Writers ([www.ndsu.edu/cfwriters](http://www.ndsu.edu/cfwriters))

The Center for Writers serves the North Dakota State University community by providing free writing assistance to students, faculty, and staff in all departments at all levels. During 30-minute, individual conferences, trained consultants offer helpful advice for writers to focus, organize, develop, and clarify their ideas and properly cite sources. Feedback is also given on personal documents such as resumes and cover letters. In addition, the director and assistant director are available to help instructors develop writing assignments and integrate writing into their courses.

The center is located on the lower level of the NDSU library. Advance appointments are recommended, but walk-ins will be accepted if consultants are available. Call 231-7927 or stop at the reception desk in the office.

## Collaborative Student Registration

A collaborative student is one who chooses to enroll at more than one North Dakota University System (NDUS) institution for a particular term. The institution from which the student is earning a degree is considered the "home institution." The institution(s) that supplies courses for a degree is considered the "provider institution(s)." The following guidelines pertain to courses taken collaboratively:

1. The collaborative process allows NDSU to combine credit from more than one NDUS institution for the purpose of financial aid (for courses added through the seventh business day from the start of the term).
2. The student pays provider campus tuition/fees for the collaborative course(s). This additional amount is included in the student's accounts receivable balance at NDSU.
3. Collaborative courses are not subject to the NDSU tuition cap.
4. The student cannot exceed a total of 20 credits between NDSU and the provider institution(s) without special permission from the Registrar at both (all) campuses.
5. The student must follow NDSU's academic dates and deadlines for adding/dropping collaborative courses.
6. Drop/adds must be administered through the collaborative contact at NDSU, 110 Ceres Hall.
7. Courses will be posted as transfer credit once NDSU receives an official transcript from the provider institution. Note: grades earned in collaborative courses may be used in determining financial aid satisfactory progress.
8. Completion of this form does not guarantee registration into the requested course(s). However, if the request(s) cannot be processed, you will be notified at the e-mail address or phone number you provide.

## Distance and Continuing Education

([www.ndsu.edu/DCE](http://www.ndsu.edu/DCE))

Distance and Continuing Education is an outreach unit of the university that makes the resources of the institution available in a variety of traditional and non-traditional ways, including distance learning educational opportunities. Courses, locations, and delivery systems are planned in response to requests and identified needs. Distance and Continuing Education activities fall into three main programming categories: degree credit, non-degree credit, and non-credit.

### Degree Credit

Distance and Continuing Education offers regular credit courses on-campus, off-campus, and via distance formats, as a supplement to the work of academic departments. Students wishing to take degree credit courses through Distance and Continuing Education must be admitted to the university. Interested individuals must complete application procedures through the Office of Admission or The Graduate School.

### Non-Degree Credit

Distance and Continuing Education also offers credit courses on-campus, off-campus, and via distance formats that are not applicable for degree programs. These are typically referred to as professional development courses and are numbered 600. Students need not be admitted to the institution to enroll in non-degree credit courses.

### Non-Credit

Distance and Continuing Education offers a wide array of workshops, conferences, and in-service activities, which may occur for an hour or a day or be intermittent and distributed over several months. The purpose of these activities is to provide individuals or organizations with learning opportunities in specialized training, personal development, job skill enhancement, meeting Continuing Education Unit (CEU) requirements, and general interests.

## Distance and Technology-Enhanced Learning

Distance and Continuing Education uses a wide range of distance delivery systems for all types of activities including satellite, the North Dakota Interactive Video Network (ND IVN), the Web, Internet, video- and print-based correspondence, videoconferencing, and combinations thereof. These distance delivery technologies bridge geographic limitations and allow students to complete work on their own any time, any place.

### Continuing Education Fees

Students enrolled in degree credit courses administered through Distance and Continuing Education may expect to pay tuition and fees at rates comparable to resident tuition and fee rates. In cases where delivery costs are higher, or for specialized programs, fees may be higher. Both non-degree credit and non-credit activity course fees vary widely. Continuing Education reserves the right to adjust course fees as needed without prior notice. Courses offered through Distance and Continuing Education generally count toward credit totals for financial aid but do not count toward the NDSU tuition cap.

For more information, contact Distance and Continuing Education, 206 Engineering Technology, phone 231-7015, fax 231-7016, or go online.

## International Program Services

([www.ndsu.edu/International](http://www.ndsu.edu/International))

As part of the Division of Academic Affairs, the Office of International Programs provides leadership and support services for all aspects of international education. Students and scholars from other countries are welcome at NDSU. The Office of International Programs provides services to assist international students and scholars prior to and after arrival at the university. These services include preparation for arrival, airport pickup, orientation, advising on personal matters, and assistance with immigration legal compliance. Additional information is provided to international students and scholars through newsletters and informational seminars. Students from the U.S. and other countries may receive assistance with planning experiences abroad in the Office of International Programs. Information is provided to students through group seminars and individual advising. International student I.D. cards, country and program brochures, and travel related information are available to all students. International activities also are coordinated through the Office of International Programs. The main event each year is International Week, which highlights the advantages of learning about world cultures through displays, lectures, film, food fair, and cultural shows. Students may participate in activities off campus, such as the Tri-College Community Welcome Picnic, Public Schools' Speakers Programs, and a variety of local cultural events. Information on all matters pertaining to international students and scholars as well as prospective study abroad students is available online, in Ceres Hall 338, or by calling 231-7895.

### Global Studies

The Office of International Programs (OIP) facilitates international educational opportunities for students, staff, and faculty. Exchange agreements are coordinated between NDSU and foreign universities offering opportunities for international study, teaching, or research for the campus community.

### Study Abroad ([www.ndsu.edu/International](http://www.ndsu.edu/International))

Experience abroad can provide an invaluable education for students. Studying, working, interning, or traveling abroad offers many benefits, such as increasing cultural awareness, improving language skills, and developing in-depth knowledge in a particular field from an international perspective. International experience also offers career advantages because employers increasingly seek to hire individuals who have multinational and multicultural perspectives and experience.

NDSU currently has exchange programs with universities in Australia, Chile, Denmark, England, France, Germany, Italy, Korea, Mexico, Morocco, the Netherlands, Norway, Spain, and Sweden, and is continuing to develop exchange programs in additional countries. Students can choose from semester-long programs as well as academic-year and summer programs. In addition, short-term options exist, including study tours during Spring Break and summer. NDSU is also a member of the International Student Exchange Program (ISEP), which offers programs in more than 100 sites throughout the world, including Africa, Asia, Australia, Canada, Europe, and Latin America. Students pay NDSU tuition and fees while studying abroad an NDSU exchanges or through ISEP.

Students may also take advantage of numerous programs offered through affiliate study abroad providers, national organizations, consortia, and other universities. Students are typically able to retain their normal financial aid package and are responsible for the costs of airfare and travel, housing, and other living expenses abroad. Information about current study abroad opportunities is available online, in the Office of International Programs (Ceres Hall 338), by calling 231-7895, or by e-mail at [ndsu.international@ndsu.edu](mailto:ndsu.international@ndsu.edu).

## Multicultural Student Services

([www.ndsu.edu/multicultural](http://www.ndsu.edu/multicultural))

The Department of Multicultural Student Services assists students, faculty, and staff in creating a culturally diverse and sensitive campus at NDSU. MSS works with prospective and enrolled students by providing student support programs, cultural and personal growth experiences, and serving as an advocate for minority issues on campus. NDSU enrolls more than 450 students who identify as minorities, including African American, American Indian, Asian/Pacific Islander, and Hispanic/Latino.

## Native American Pharmacy Program

([www.ndsu.edu/pbarmacy/napp](http://www.ndsu.edu/pbarmacy/napp))

A special program at NDSU is designed to attract and support Native Americans who have an interest in entering the pharmacy field. An extensive preliminary education component provides enrichment in the science and mathematics area for college students during the summer. Additional information is available by calling 231-8205.

## Project 65

People aged 65 or over may audit one course per semester free of tuition and related fees, with the exception of a one-time \$35 application fee.

Project 65 students are encouraged to purchase the textbooks for their courses. The transcript of a student auditing a course will show a grade of "Audit" for the course, which will not count as credit toward a degree. By definition, an auditor may attend class only as a listener. Students wishing to earn credit toward a degree must pay all tuition and fees and complete all assignments and tests.

Students should identify themselves as participants in the Project 65 program at the time of registration. For more information, contact the Office of Registration and Records, 110 Ceres (231-7981).

## Reserve Officers Training Corps (ROTC) Program

([www.ndsu.edu/armyrotc](http://www.ndsu.edu/armyrotc)) or ([www.ndsu.edu/afrotc](http://www.ndsu.edu/afrotc))  
The Reserve Officers Training Corps program at NDSU is voluntary and open to both male and female students. The program consists of Army and Air Force ROTC. The activities are conducted under separate Departments of Military Science and Aerospace Studies. Students may elect either Army or Air Force ROTC.

The first two years of the regular four-year course of ROTC at NDSU are designated as the Basic Course for Army ROTC and General Military Course for Air Force ROTC; non-ROTC scholarship students participating in the basic or general course incur no military obligation or commitment.

The last two years of Army ROTC are designated as the Advanced Course. The last two years of Air Force ROTC are designated as the Professional Officer Course (POC). Qualified students may apply for and be accepted in either of these courses with a commission as Second Lieutenant in the United States Army or Air Force as the objective. The Army ROTC program also offers commissions in the Army National Guard or Reserves.

To be eligible for consideration and admission to the Advanced or Professional Officer Course, a student must be (1) a citizen of the United States, (2) of good moral character, (3) have completed either the basic or general military course or the six-week basic summer training period or have received credit in lieu thereof, (4) have successfully completed the prescribed physical examinations and (5) in general, able to complete all requirements for a commission prior to age 30. See the Military Science (Army ROTC) or Aerospace Studies (Air Force ROTC) office for additional details of the requirements. Students selected for admission to the Advanced or Professional Officer Course are required to sign a written agreement to fulfill certain conditions required by law and service regulations. Students so enrolled are required to attend a four-, five-, or six-week summer training period. These students earn monthly pay plus travel expenses while attending summer training.

Military uniforms, textbooks, and equipment are furnished without charge to all ROTC students. Advanced students receive a tax-free government subsistence up to \$4,000 for each academic year that they are enrolled in the advanced ROTC program.

ROTC two-, three-, and four-year scholarships may be awarded to students who meet established criteria. Each scholarship provides for tuition, fees, help toward the purchase of textbooks and supplies in addition to the \$4,000 (average) subsistence for each academic year that the scholarship is in effect.

For a description of Army and Air Force ROTC courses, see the departmental course listings under Aerospace Studies and Military Science.

## Summer Session

The 12-week summer session is designed to provide course work within various time intervals. The standard four-week session begins in May; the standard eight-week session begins in June. There also are variations within these sessions to provide for maximum flexibility to summer students.

Each college determines its summer offerings, based upon previous experience, programmatic needs, and special requests. Special effort is made to offer courses approved for fulfilling general education requirements. A schedule of the summer session course offerings is available online at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar) or from the Office of Registration and Records, 110 Ceres. For information on summer school, please call 231-8492 or 231-6133.

### Fees and Housing

Fees are listed in the summer schedule. Information concerning summer housing may be secured by contacting the Department of Residence Life, P.O. Box 5481, Fargo, ND 58105, or 231-7557 (toll-free 1-800-572-8840).

### Undergraduate Admission Requirements

The course offerings of the summer school are open to all qualified students. Students may enroll as degree candidates by meeting general university requirements as described elsewhere in this bulletin and submitting an application for admission to the Office of Admission. Students attending another institution but wishing to enroll for summer school at the university may apply for special status by submitting a Special Student Application for Admission, a \$35 nonrefundable application fee, and an official transcript from their home institution (if course work was attempted within one year prior to application).

### Credit for Courses

While the time interval of the individual sessions is different than that of the normal semester, each course carries full credit because classes meet the same number of hours as in the standard semester.

### Graduate Work

A range of opportunities is available for graduate work during the summer session as evidenced by the traditionally high enrollment of graduate students. A considerable number of graduate courses is offered, but generally the summer serves as an important term for students to work on their research requirements, especially if field work is involved. Work on disquisitions and individual study arrangements frequently are facilitated during summers. Courses scheduled to begin at different times and for varying periods provide a high level of flexibility. Thus, those who may have only a portion of a given summer available are likely to find courses that meet their scheduling limitations. In addition, workshops, internships, and other special programs are offered. Teachers generally find the summer school designed to offer attractive selections as components of a degree program, as well as courses directed toward improvement of professional skills. Persons interested in graduate programs are urged to contact the College of Graduate and Interdisciplinary Studies for further information.

## Tri-College University ([www.tri-college.org](http://www.tri-college.org))

Tri-College University (TCU) is a consortium of the three major Fargo-Moorhead institutions of higher education: NDSU, Concordia College, and Minnesota State University Moorhead. Students at the three schools may benefit from what each school offers individually and cooperatively through the consortium.

Through the Tri-College course exchange, students enrolled at one campus may take courses at the other two at no extra cost and without going through separate admission procedures. Tri-College expands discipline offerings and course availability for students beyond their home campus. Tuition is paid only to the home-base campus. Courses not eligible for Tri-College registration are those offered through NDSU's Division of Distance and Continuing Education, off-campus or weekend courses offered through MSUM's Continuing Education program, most workshops, independent study courses at Concordia College, and private music instruction at Concordia.

Students enrolling in classes that require special fees (lab fees, lessons, supplies, etc.) beyond the home-campus fees assessed at the time of registration will be responsible for remittance of payment to the billing department or institution.

**Course limits.** Concordia students — and MSUM or NDSU students wanting to take a course at Concordia — may take only one course per term under the student course exchange, and then, only if they are full-time students and only if that course is not available on their home campus at any time during the academic year. Concordia does not participate in the TCU course exchange during the summer. NDSU students wishing to enroll in MSUM course work are expected to maintain enrollment (at least one course) at NDSU each semester. Concordia and MSUM business courses taken via Tri-College may not be applied to professional programs (majors and minors) in the College of Business at NDSU.

**Grades.** Grades received through the TCU course exchange will be applied to the student's home campus grade-point average.

**Credits.** Credits earned through TCU course exchange will appear on a student's transcript and be applied toward graduation requirements as though they were taken at their home-campus.



**Course substitutions.** Students need to obtain advanced approval to substitute TCU courses for required courses in a major or minor.

**Drop/add deadlines.** Students follow their home-campus deadlines to drop or add a course, or to enroll as pass/fail, instead of at the TCU partner school where the course is offered or hosted.

**Registration procedures.** Students register for TCU exchange courses at their home campus and pay their home campus tuition and fees. (NDSU students register in person in the Office of Registration and Records, 110 Ceres Hall.)

### **Tri-College Minors**

The Tri-College partners recognize minors earned through the TCU course exchange. This means students can receive recognition on their graduation transcripts for minors completed on one of the other TCU campuses. This policy applies only to minors earned in programs not available on a student's home-campus.

### **Majors**

Majors may be earned only at the school from which a student graduates. Most students enroll initially at the school from which they intend to graduate, but the TCU course exchange agreement between MSUM and NDSU allows a student to enroll at one of these schools for two or three years, while pursuing a major they will complete after transferring to the other school. Select programs have specially-designed articulation agreements intended to provide a seamless transfer process for TCU students. Students should work with the chair of the department in which they intend to major to make sure their program includes all requirements for the major and for graduation. Students may apply for tuition reciprocity prior to transferring from their home state. In addition, Tri-College graduate programs exist in Educational Leadership and Nursing.

### **Library Services**

Students, faculty, and staff of the TCU institutions may use all of the libraries in the consortia. Circulating materials from TCU libraries are available free of charge for direct checkout or through interlibrary loan via daily shuttle service.

A regional computer-based catalog shows availability of materials at the TCU libraries as well as more than 100 other libraries. In addition, a cooperative video collection maintained at MSUM makes videos available for onsite viewing and checkout. For details, contact a TCU library.

### **Bus and Parking Services**

A Tri-College bus schedule provides intercampus transportation to Concordia, MSUM, and NDSU every half hour. The bus is operated weekdays by the City of Fargo during the NDSU/MSUM academic year; it is not available during the summer. Bus schedules are available at the TCU office and at several locations on each campus.

A separate parking permit is not issued for Tri-College University parking. If vehicles have a current home-campus permit, they may be parked in the following lots on other campuses.

**Concordia:** TCU students, faculty, and staff can park in Parking Lot MH/C.

**MSUM:** TCU students can park in Lots P and K. TCU faculty and staff may park in Lots P, K, and F.

**NDSU:** TCU students can park in R Lot. TCU faculty and staff permits are valid for T-1 Lot.

All drivers are subject to traffic regulations of the respective institutions. Lot restrictions are eased after 5 p.m., but there is no overnight parking.

## **TRIO Programs** ([www.ndsu.edu/trio](http://www.ndsu.edu/trio))

Child Care Access Means Parents In School, McNair Scholars Program, Student Support Services, Upward Bound, and Veterans Upward Bound are funded by the U.S. Department of Education and administered by the Division of Student Affairs and the Office of TRIO Programs, 319 Ceres Hall (231-8028).

### **Child Care Access Means Parents In School**

Child Care Access Means Parents In School (CCAMPIS) assists income-eligible student parents with child care expenses, thereby providing student parents with financial support so they can stay in school and complete their degrees. Graduating parents will serve as a positive role model for their children and for future generations. Students attending at least six credits per semester and receiving a Pell grant are eligible to apply to CCAMPIS. Funding for CCAMPIS is provided through a \$64,000 per year grant from the U.S. Department of Education.

### **McNair Scholars Program**

The McNair Scholars Program (MSP) increases the number of professors and doctorally prepared graduates from traditionally underrepresented populations. The program provides eligible juniors and seniors with a stipend, counseling, academic enrichment, preparation for graduate school entrance examinations, and opportunities for research under the guidance of university professors. The principle

purpose of the program is to increase the rate of graduate enrollment, completion of the doctorate, and attainment of professorial positions for low income, first generation, and underrepresented college students. Funding for the McNair Scholars Program is provided through a \$242,207 per year grant from the U.S. Department of Education.

### **Student Support Services**

The Student Support Services (SSS) project provides tutoring, small group instruction, and support services to university students who meet eligibility requirements and are in need of assistance. The instruction and tutoring services are offered on an individualized basis in mathematics, science, English, reading, assistive technology, computer literacy, and study skills as well as some specialized course areas. The purpose is to maximize students' chances of success in their university course work. Freshman and sophomore Pell grant recipients that have unmet need in their financial aid package may be eligible for additional grant aid while participating in Student Support Services. Funding for Student Support Services is provided through a \$402,621 grant from the U.S. Department of Education.

### **Upward Bound**

The Upward Bound (UB) project serves high school students who want to get a college degree. To qualify, students must be in the target area and be income eligible or a potential first generation college student. In the summer, students attend a six-week camp on the NDSU campus that includes instruction and tutoring in math, science, English, Spanish, computer technology, and study skills. During the academic year, students regularly visit campus for academic instruction, career and college preparation along with fun, cultural activities. The project also provides tutoring and other individualized academic assistance at their respective high schools. Graduating seniors, called "bridge students," take an entry level college class at the NDSU campus before moving on to the college of their choice. Students receive cost free services as well as receiving a monthly stipend for participation. Funding for Upward Bound comes from a \$234,624 grant from the U.S. Department of Education.

### **Veterans Upward Bound**

The Veterans Upward Bound (VUB) project provides individualized education opportunities for veterans who want to obtain academic preparation before entering or during postsecondary education. Course work in English, computer literacy, mathematics, science, and reading is designed to prepare veterans for successful participation in postsecondary education. The program also offers General Education Development (GED) test preparation for veterans lacking a high school diploma. In addition to academic course work, the project provides advising and referral services. Veterans may be eligible to receive educational benefits while attending VUB. Funding for the program is provided through a \$265,319 grant from the U.S. Department of Education.

## **University Honors (Scholars) Program**

The University Honors Program is an interdisciplinary program designed for students of exceptional ability whose interests range well beyond their primary majors. The program consists of a series of interdisciplinary colloquia; these are limited to 20 students and, in the second year, are taught by teams of two or more faculty members. Graduation from the Honors Program requires 18 hours of honors courses and a senior project.

### **First-Year (6 credits)**

English 121 Honors Composition II, HON 199 Honors Inquiry Literature and Ideas: an interdisciplinary investigation of conflicting values

### **Second-Year (6 credits)**

An interdisciplinary course each semester  
Offerings vary; exploration of topics such as the perspective of world literature on the human condition, problems of world hunger, the diverse ways of understanding nature, ethical issues in the sciences, the perspectives of the world press

### **Third-Year (6 credits)**

Fall semester: an interdisciplinary colloquium  
Spring semester: student/faculty led discussions on texts chosen by the student participants

### **Fourth-Year (4 credits)**

Senior Project  
Independent, faculty-guided reading and research leading to a completion of the Senior Honors Project

For admission to the program, contact: University Honors Program, College of Arts, Humanities and Social Sciences, Minard Hall.

# Academic Information and Regulations

Degrees at both the undergraduate and graduate levels are offered at North Dakota State University. For the various programs of study leading toward baccalaureate degrees, consult the college sections of this bulletin. Graduate degree requirements and fields of study are summarized in the College of Graduate and Interdisciplinary Studies section of this bulletin. For more complete details, see The Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml)

## Undergraduate Areas of Study

Course work is available in the areas listed by major within each college according to the categories indicated. Consult the index for page numbers.

### Key:

- M Undergraduate/Baccalaureate major
- o Option (area of emphasis, concentration, or specialization within a major)
- T Teacher certification available
- m Undergraduate minor
- c Certificate program

## *College of Agriculture, Food Systems, and Natural Resources*

- M, m Agribusiness
- M Agricultural Economics
- M, m Agricultural Systems Management
  - o Agribusiness
  - o Applied Technology
  - o Dealership Management
  - o Production Agriculture
- M, m Animal and Range Sciences
  - o Production/Business
  - o Range Science
  - o Science
- M, m Biotechnology
- M, m Crop and Weed Sciences
  - o Biotechnology
  - o Production
  - o Science
  - o Weed Science
- M, m Economics
- M, m, c Equine Studies
- M, m, Food Safety
- M Food Science
- M, m General Agriculture
- M, m Horticulture
  - o Horticulture Biotechnology
  - o Horticulture Science
  - o Landscape Design
  - o Production/Business
  - o Urban Forestry and Parks
- m Large Animal Veterinary Technology
- M, m Microbiology
  - o Pre-veterinary Medicine
- M Natural Resources Management
  - o Biotic Resources
  - o Environmental Communication
  - o Natural Resources Economics
  - o Physical/Earth Resources Sciences
  - o Pollution Sciences
  - o Social Sciences
- M, m Soil Science
- M Sports and Urban Turfgrass Management
- M Veterinary Technology

## *College of Arts, Humanities and Social Sciences*

- M, m Agricultural Communication
- M, m Anthropology
- M, m Art
- M, m Classical Languages
- m Community Development
- M, m Criminal Justice
- M, m Emergency Management
- M, T, m English
- M, T, m French

- m French Studies
- m Gerontology
- M, m Health Communication
- M, T, m History
- M, m Humanities
- M, m Journalism, Broadcasting and Mass Communication Technologies
- M, m Management Communication
- M, T, m Music
- M, m Philosophy/Humanities
- M, m Political Science
  - o Public Service
  - o Pre-Law
- M Public History
- M, m Public Relations and Advertising
- m Religious Studies
- M, T Social Science
- M, m Sociology
  - o Medical Sociology
- M, T, m Spanish
- m Spanish Studies
- M, m Theatre Arts
  - o Design and Technology
  - o Performance
- m Web Design
- M, m Women's Studies
- College of Business
- M, m Accountancy
- M, m Accounting
- m Agribusiness (Corporate Track)
- M, m Business Administration
  - o Electronic Commerce
- c Finance
- m Fraud Investigation
- c Human Resource Management
- m Logistics Management
- M, m Management Information Systems
- c Marketing

## *College of Engineering and Architecture*

- m Aerospace Studies—Air Force ROTC
- M Agricultural and Biosystems Engineering
- M, m Architecture (M.Arch.)
- M Civil Engineering
- M Computer Engineering
- M Construction Engineering
- M, m Construction Management
- M Electrical Engineering
  - o Biomedical Engineering
  - o Communication and Signal Processing
  - o Computer Engineering
  - o Control Engineering
  - o Electromagnetics
  - o Electronics and Microelectronics
  - o Optical Engineering
  - o Power Systems
- M Environmental Design
- M, m Industrial Engineering and Management
  - o General Engineering
  - o Health Care Management
  - o Human Factors Engineering
  - o Lean Enterprise
  - o Manufacturing Systems Design
  - o Operations Research
  - o Production and Inventory Control
  - o Project and Engineering Management
  - o Reliability and Quality Management
- M, m Landscape Architecture
  - o Design and Communications
  - o Landscape Construction and Technology
  - o Land Reclamation
  - o Natural Resources Management
  - o Rural Community Development
- M Manufacturing Engineering
  - o Computer Integrated Manufacturing

- o Lean Enterprise
  - o Production Engineering
  - o Manufacturing Systems Design
- M Mechanical Engineering
- o Coatings and Polymeric Materials
- m Military Science—Army ROTC
- M Natural Resources Management
- See options under College of AFSNR

### **College of Human Development and Education**

- M, m Apparel and Textiles
- o Apparel Studies
- o Retail Merchandising
- M Athletic Training
- M, m Child Development and Family Science
- o Child Development
  - o Family Science
- m Coaching
- M Dietetics
- o Coordinated Program (CP)
  - o Didactic Program
- m Gerontology
- M, m Hospitality and Tourism Management
- M Human Performance and Fitness
- m Individual and Family Wellness
- M, m Interior Design
- m Nutrition
- M Sport and Recreation Studies
- o Recreation Management
  - o Sport Management
- M, m Women's Studies

#### **Secondary Education**

- M, T Agricultural Education
- M, T Biological Sciences Education
- M, T Chemistry Education
- M, T Comprehensive Science Education
- M, T Earth Science Education
- M, T, English Education
- m Extension Education
- M, T Family and Consumer Sciences Education
- M, T French Education
- M, T, m Health Education
- o Community Health
  - o School Health
- M, T History Education
- M, T Mathematics Education
- M, T, m Music Education-Instrumental (K-12)
- M, T, m Music Education-Vocal (K-12)
- M, T, m Physical Education (K-12)
- M, T Physics Education
- M, T, Social Science Education
- M, T Spanish Education

**Elementary Education is offered by Valley City State University as a dual degree/major with Child Development and Family Science at NDSU.**

### **College of Pharmacy, Nursing, and Allied Sciences**

- M Clinical Laboratory Science
- M Nursing
- M Pharmaceutical Sciences
- M Pharmacy Doctorate (Pharm.D.)
- M Radiologic Sciences
- M Respiratory Care

### **College of Science and Mathematics**

- M, m Behavioral Statistics
- m Biochemistry
- M Biochemistry and Molecular Biology
- M, T, m Biological Sciences
- o Environmental Science
- M, m Biotechnology
- M, m Botany
- M, T, m Chemistry
- o Biochemistry
  - o Chemistry Education
  - o Coatings and Polymeric Materials
  - o Pre-Professional Chemistry

- m Coatings and Polymeric Materials
- M, m Computer Science
- m Geography
- M, m Geology
- M, T, m Mathematics
- o Pre-Actuarial Science
- M Natural Resources Management
- See options under College of AFSNR
- M, T, m Physics
- o Computational Physics
  - o Optical Science and Engineering
- M, m Psychology
- M, m Statistics
- M, m Zoology
- o General Zoology
  - o Fisheries, Wildlife, Ecology, and Behavior
  - o Physiology, Cell Biology, or Health Sciences
- Pre-Professional preparation includes:
- o Chiropractic
  - o Dentistry
  - o Medicine
  - o Mortuary Science
  - o Optometry
  - o Osteopathy

### **College of University Studies**

M University Studies

Programs in the College of University Studies involve general studies for the deciding students or the Bachelor of University Studies degree (a tailored degree program) for students with distinctive educational goals.

#### **Interdisciplinary Undergraduate Programs**

- M, m Biotechnology
- M International Studies (second major only)
- m Fraud Investigation
- m Gerontology
- m Logistics Management
- M Natural Resources Management
- M, m Women's Studies

## **Majors and Degrees Available**

### **Major Degree**

#### **A**

- Accountancy B.Acc.
- Accounting B.A., B.S.
- Agribusiness B.S.
- Agricultural and Biosystems Engineering B.S., M.S., Ph.D.
- Agricultural Communication, B.A., B.S.
- Agricultural Economics B.S., M.S.
- Agricultural Education B.S., M.Ed., M.S.
- Agricultural Systems Management B.S.
- Agriculture, General B.S.
- Animal and Range Sciences B.S., M.S., Ph.D.
- Anthropology B.A., B.S.
- Apparel and Textiles B.A., B.S.
- Architecture M.Arch.
- Art B.A., B.F.A., B.S.
- Athletic Training B.A., B.S.

#### **B**

- Behavioral Statistics B.A., B.S.
- Biochemistry M.S., Ph.D.
- Biochemistry and Molecular Biology B.A., B.S.
- Biological Sciences B.A., B.S.
- Biological Sciences Education B.A., B.S.
- Biology M.S.
- Biotechnology B.A.<sup>1</sup>, B.S.
- Botany B.A., B.S., M.S., Ph.D.
- Business Administration B.A., B.S., M.B.A.

#### **C**

- Cellular and Molecular Biology Ph.D.
- Cereal Science M.S., Ph.D.
- Chemistry B.A., B.S., M.S., Ph.D.
- Chemistry Education B.A., B.S.

Child Development and Family Science B.A., B.S., M.S.  
 Civil Engineering B.S., M.S., Ph.D.  
 Classical Languages B.A., B.S.  
 Clinical Laboratory Science B.A., B.S.  
 Coatings and Polymeric Materials M.S., Ph.D.  
 Communication Ph.D.  
 Comprehensive Science Education B.A., B.S.  
 Computer Engineering B.S.  
 Computer Science B.A., B.S., M.S., Ph.D.  
 Construction Engineering B.S.  
 Construction Management B.S.  
 Counseling M.Ed., M.S.  
 Criminal Justice B.S., M.S., Ph.D.  
 Crop and Weed Sciences B.S.

**D**  
 Dietetics B.A., B.S.

**E**  
 Earth Science Education B.A., B.S.  
 Economics B.A., B.S.  
 Education M.Ed., M.S., Ed.D., Ph.D.  
 Educational Leadership M.Ed., M.S., Ed.S.  
 Electrical and Computer Engineering M.S., Ph.D.  
 Electrical Engineering B.S.  
 Emergency Management B.A., B.S., M.A., M.S., Ph.D.  
 Engineering Ph.D.  
 English B.A., B.S., M.A.  
 English Education B.A., B.S.  
 Entomology M.S., Ph.D.  
 Environmental and Conservation Science M.S., Ph.D.  
 Environmental Design B.S.  
 Environmental Engineering M.S.  
 Equine Studies B.S.

**F**  
 Family and Consumer Sciences Education B.S., M.Ed., M.S.  
 Food Safety B.S., M.S., Ph.D.  
 Food Science B.S.  
 French B.A., B.S.  
 French Education B.A., B.S.

**G**  
 Genomics and Bioinformatics M.S., Ph.D.  
 Geology B.A., B.S.

**H**  
 Health Communication B.A., B.S.  
 Health Education B.S.  
 History B.A., B.S., M.A., M.S., Ph.D.  
 History Education B.A., B.S.  
 Horticulture B.S., M.S.  
 Hospitality and Tourism Management B.A., B.S.  
 Human Development Ph.D.  
 Human Performance and Fitness B.A., B.S.  
 Humanities B.A., B.S.

**I**  
 Industrial Engineering and Management B.S., M.S.  
 Industrial and Manufacturing Engineering Ph.D.  
 Interior Design B.A., B.S.  
 International Agribusiness M.S.  
 International Studies<sup>2</sup> B.A., B.S.

**J**  
 Journalism, Broadcasting, and Advertising, B.A., B.S.

**L**  
 Landscape Architecture B.L.A.

**M**  
 Management Communication B.A., B.S.  
 Management Information Systems B.S.  
 Manufacturing Engineering B.S., M.S.  
 Mass Communication M.A., M.S.  
 Materials and Nanotechnology, Ph.D.  
 Mathematics B.A., B.S., M.S., Ph.D.  
 Mathematics Education B.A., B.S.  
 Mechanical Engineering B.S., M.S., Ph.D.  
 Merchandising M.S.  
 Microbiology B.S., M.S.  
 Molecular Pathogenesis Ph.D.  
 Music B.A., B.S., B.Mus., M.M., D.M.A.  
 Music Education-Instrumental B.A., B.S.  
 Music Education-Vocal B.A., B.S.

**N**  
 Natural Resources Management B.S., M.S., Ph.D.  
 Nursing B.S.N., M.S.  
 Nursing Practice D.N.P.  
 Nutrition and Exercise Science M.S.

**P**  
 Pharmaceutical Sciences B.S., M.S., Ph.D.  
 Pharmacy Pharm.D.  
 Philosophy/Humanities B.A., B.S.  
 Physical Education B.A., B.S.  
 Physics B.A., B.S., M.S., Ph.D.  
 Physics Education B.A., B.S.  
 Plant Pathology M.S., Ph.D.  
 Plant Sciences M.S., Ph.D.  
 Political Science B.A., B.S.  
 Public History, B.A., B.S.  
 Public Relations and Advertising, B.A., B.S.  
 Psychology B.A., B.S., M.S., Ph.D.

**R**  
 Radiologic Sciences B.A., B.S.  
 Recreation Management B.A., B.S.  
 Respiratory Care B.A., B.S.

**S**  
 Social Science B.A., B.S., M.S.  
 Social Science Education B.A., B.S.  
 Sociology B.A., B.S., M.S.  
 Software Engineering M.S., Ph.D.  
 Soil Science B.S., M.S., Ph.D.  
 Spanish B.A., B.S.  
 Spanish Education B.A., B.S.  
 Speech Communication M.A., M.S.  
 Sports and Urban Turfgrass Management B.S.  
 Statistics B.A., B.S., Ph.D.  
 Statistics, Applied M.S.

**T**  
 Theatre Arts B.A., B.F.A., B.S.  
 Transportation and Logistics M.M.L., Ph.D.

**U**  
 University Studies B.U.S.

**V**  
 Veterinary Technology B.S.

**W**  
 Women's Studies B.A., B.S.

**Z**  
 Zoology B.A., B.S., M.S., Ph.D.

<sup>1</sup> B.A. degree with this major only available through the College of Science and Mathematics.

<sup>2</sup> Offered only when taken concurrently with another major.

## General Education Program

The purpose of general education at NDSU is to ensure that students acquire knowledge, perspectives, and skills associated with a university education. The program is designed so that graduates will be able to adapt to and anticipate changes in their profession and in society. Graduates also will be able to integrate and use the knowledge and perspectives they have gained to live productive, intellectually rewarding and meaningful lives.

### Intended Student Outcomes

The intended student outcomes resulting from general education include the following abilities:

1. Communicate effectively in a variety of contexts and formats.
2. Locate and use information for making appropriate personal and professional decisions.
3. Comprehend the concepts and perspectives needed to function in national and international societies.
4. Comprehend intrapersonal and interpersonal dynamics.
5. Comprehend concepts and methods of inquiry in science and technology, and their applications for society.
6. Integrate knowledge and ideas in a coherent and meaningful manner.
7. Comprehend the need for lifelong learning.

### General Education Requirements

The following requirements apply to all undergraduate students who enter NDSU in pursuit of a baccalaureate degree. Only courses approved by the University Senate Standing Committee on General Education and by the University Senate may be used to fulfill category requirements. NDSU uses alphabetic indicators to identify its general education categories as shown on the following list of category requirements. The alphabetical indicators are used primarily on departmental curriculum guides to facilitate program planning. General education courses are subject to change. A current and complete listing of general education requirements is available at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar).

#### Total Required Credits from General Education Categories . . . . . 37\*

\*The General Education requirement is 36 credits for students who transfer 24 or more semester credits to NDSU. Some major programs require additional or specific general education course requirements. This requirement will change to 40 (39) to include three additional upper-division writing course credits in the Communication category for new students entering in fall 2007.

## Courses Approved for General Education (as of May 2006)

**First Year Experience Course (F) . . . . . 1**  
 A first-year experience course is required of all entering freshmen and new students who transfer fewer than 24 semester credits to NDSU.

ABEN/AGRI/BUSN/HD&E/ME/UNIV 189,  
 Skills for Academic Success. . . . . 1

### Category 1: Communication (C) . . . . 9 (12\*)

#### Lower-Division:

COMM 110, Fundamentals of Public Speaking. . . . 3  
 ENGL 110, College Composition I . . . . . 3  
 or ENGL 111, Honors Composition I . . . . . 3  
 or ENGL 112, ESL College Composition I . . . . 3  
 ENGL 120, College Composition II . . . . . 3

or ENGL 121, Honors Composition II . . . . .	3
or ENGL 122, ESL College Composition II . . . . .	3
Upper-Division, Writing Course . . . . .	3*

**Approved Writing Courses (to date):**

- English 320, Business/Professional Comm
  - English 321, Writing in the Technical Professions
  - English 324, Writing in the Sciences
  - English 358, Writing in Hum/Social Sci
- \*Beginning fall 2007, an upper-division, writing-intensive course will be required for students entering NDSU.

**Category 2: Quantitative Reasoning (R) . . . 3**

CSCI 122, Beginning BASIC/Visual BASIC . . . . .	3
CSCI 125, Beginning COBOL . . . . .	3
CSCI 159, Computer Science Problem Solving . . . . .	3
MATH 104, Finite Mathematics . . . . .	3
MATH 146, Applied Calculus I . . . . .	4
MATH 165, Calculus I . . . . .	4
STAT 330, Introductory Statistics . . . . .	3

**Category 3: Science & Technology (S) . . . 10**

- Courses in the areas of natural science, physical science, and technology are included in this category.
- A minimum of 4 general education credits must be in natural or physical sciences.
- A one-credit laboratory must be taken as a co-requisite with a general education science and technology course unless the course includes an embedded lab experience equivalent to a one-credit course.

**Natural Science:**

● ARSC/NRM 225, Nat Res & Agro-ecosystems . . . . .	3
BIOL 111/111L, Concepts of Biology/Lab . . . . .	3/1
● BIOL 124/124L, Environmental Science/Lab . . . . .	3/1
BIOL/ZOO 126, Human Biology . . . . .	3
BIOL 150/150L, General Biology I/Lab . . . . .	3/1
BIOL 151/151L, General Biology II/Lab . . . . .	3/1
BIOL 220/220L, Human Anatomy & Phys I/Lab . . . . .	3/1
ENT 210, Insects, Humans, & the Environment . . . . .	3
MICR 202/202L, Intro Microbiology/Lab . . . . .	2/1
● PLSC 110, World Food Crops/Lab . . . . .	3
PLSC 111, Genetics and You . . . . .	2
PLSC 210/211, Horticulture Science/Lab . . . . .	3/1
PLSC/BIOL/BOT/ZOO 315/315L, Genetics Lab . . . . .	3/1

**Physical Science:**

CHEM 117/117L, Chem Concepts & Appl/Lab . . . . .	3/1
CHEM 121/121L, General Chemistry I/Lab . . . . .	3/1
CHEM 122/122L, General Chemistry II/Lab . . . . .	3/1
● GEOL 105/105L, Physical Geology/Lab . . . . .	3/1
● GEOL 106/106L, The Earth Through Time/Lab . . . . .	3/1
GEOL 304, Eastern North Dakota Field Course . . . . .	1
PHYS 110/110L, Introductory Astronomy/Lab . . . . .	3/1
PHYS 120/120L, Fundamentals of Physics/Lab . . . . .	3/1
PHYS 211/211L, College Physics I/Lab . . . . .	3/1
PHYS 212/212L, College Physics II/Lab . . . . .	3/1

**Technology:**

CSCI 114, Microcomputer Packages . . . . .	3
or CSCI 116, Business Use of Computers . . . . .	4
SOIL 217, Intro to Meteorology & Climatology . . . . .	3

**Category 4: Humanities & Fine Arts (A) . . . 6**

- No more than 3 of the 6 credits may be in fine arts performance.	
ADFH 310, History of Fashion . . . . .	3
ADFH 315, History of Interiors I . . . . .	3
ADFH 316, History of Interiors II . . . . .	3
■ ADFH 410, Dress in World Cultures . . . . .	3
■ ADFH 411, Food and World Cultures . . . . .	3
● ARCH 321, History of Architecture I . . . . .	3
ARCH 322, History of Architecture II . . . . .	3
■ ART 110, Introduction to the Visual Arts . . . . .	3
● ART 111, Introduction to Art History . . . . .	3
ART 210, Art History I . . . . .	3

ART 211, Art History II . . . . .	3
CLAS 101, First-Year Latin I . . . . .	4
CLAS 151, First-Year Greek I . . . . .	4
ENGL 220, Introduction to Literature . . . . .	3
ENGL 225, Introduction to Film . . . . .	3
ENGL 251, British Literature I . . . . .	3
ENGL 252, British Literature II . . . . .	3
ENGL 261, American Literature I . . . . .	3
ENGL 262, American Literature II . . . . .	3
■ ENGL 330, British/American Women Writers . . . . .	3
■ ENGL 335, Multicultural Writers . . . . .	3
■ ENGL 336, Literature and the Environment . . . . .	3
■ ENGL 340, 19th-Century American Fiction . . . . .	3
■ ENGL 341, 20th-Century American Fiction . . . . .	3
■ ENGL 342, 19th-Century American Short Story . . . . .	3
ENGL 343, 20th-Century American Short Story . . . . .	3
■ ENGL 345: Themes in American Culture . . . . .	3
ENGR 311, History of Technology in America . . . . .	3
ENVD 101, Intro to Environmental Design . . . . .	3
● FREN 101, First-Year French I . . . . .	4
● FREN 102, First-Year French II . . . . .	4
● FREN 201*, Second-Year French I . . . . .	3
● FREN 380, Women in French Literature . . . . .	3
● GERM 101, First-Year German I . . . . .	4
● GERM 102, First-Year German II . . . . .	4
● GERM 201*, Second-Year German I . . . . .	3
HIST 101, Western Civilization I . . . . .	3
HIST 102, Western Civilization II . . . . .	3
HIST 103, U.S. to 1877 . . . . .	3
HIST 104, U.S. Since 1877 . . . . .	3
■ HIST 135, Race in U.S. History . . . . .	3
■ HIST 261, American Indian Story . . . . .	3
■ HIST 271, Intro to Latin American History . . . . .	3
● HIST 381, Australia & New Zealand . . . . .	3
■ HIST 431, The North American Plains . . . . .	3
■ HON 386, World Lit: Imaginary Homelands . . . . .	3
LA 322, History of Landscape Architecture . . . . .	4
MUSC 103, Introduction to Music History . . . . .	3
MUSC 104, Intro to Music Literature to 1825 . . . . .	3
MUSC 105, Intro to Music Lit: 1825 to Present . . . . .	3
■ MUSC 108, Roots of American Popular Music . . . . .	3
■ MUSC 201, World Music . . . . .	3
PHIL 101, Introduction to Philosophy . . . . .	3
PHIL 215, Contemporary Moral Issues . . . . .	3
POLS 240, Political Ideologies . . . . .	3
RELS 100, Introduction to Religion . . . . .	3
● SPAN 101, First-Year Spanish I . . . . .	4
● SPAN 102, First-Year Spanish II . . . . .	4
● SPAN 201*, Second-Year Spanish I . . . . .	3
THEA 110, Introduction to Theatre Arts . . . . .	3
■ THEA 115, World Film . . . . .	3
THEA 180, Dramatic Literature & Style . . . . .	3
■ THEA 280, World Theatre . . . . .	3
■ WS 110, Introduction to Women's Studies . . . . .	3

**Fine Arts Performance:**

- Performance courses must be in addition to those required for the student's major.

ART 124, Three-Dimensional Design . . . . .	3
ART 130, Drawing I . . . . .	3
MUSC 112, Varsity Band . . . . .	1
MUSC 115, University Chorus . . . . .	1
MUSC 303, Concert Band . . . . .	1
MUSC 306, Concert Choir . . . . .	1
THEA 161, Acting I . . . . .	3

**Category 5: Soc & Behavioral Sciences (B) 6**

ADFH 486, Dress & Human Behavior . . . . .	3
■ AGE 220, World Agricultural Development . . . . .	3
■ ANTH 111, Introduction to Anthropology . . . . .	3
CDFS 135, Family Science . . . . .	3
CDFS 186, Consumer & Society . . . . .	3
CDFS 230, Life Span Development . . . . .	3

CDFS 468, Families and Work . . . . .	3
■ CDFS 475, Children & Families Across Cultures . . . . .	3
COMM 112, Understanding Media/Social Change . . . . .	3
COMM 114, Human Communication . . . . .	3
COMM 212, Interpersonal Communication . . . . .	3
■ COMM 216, Intercultural Communication . . . . .	3
● ECON 105, Elements of Economics . . . . .	3
● ECON 201, Principles of Microeconomics . . . . .	3
● ECON 202, Principles of Macroeconomics . . . . .	3
● ENGR 312, Impact of Technology on Society . . . . .	3
● GEOG 151, Human Geography . . . . .	3
● GEOG 161, World Regional Geography . . . . .	3
H&CE 341, Leadership & Presentation Techniques . . . . .	3
HNES/PSYC 210, Human Sexuality . . . . .	3
HNES/PSYC 212, Psych Aspects/Drug Use/Abuse . . . . .	3
POLS 110, Introduction to Political Science . . . . .	3
POLS 115, American Government . . . . .	3
● POLS 120, Terrorism . . . . .	3
POLS 215, Probs/Policies in Am Govt . . . . .	3
● POLS 220, International Politics . . . . .	3
● POLS 225, Comparative Politics . . . . .	3
● POLS 442, Global Policy Issues . . . . .	3
PSYC 111, Intro to Psychology . . . . .	3
PSYC 211, Intro to Behavior Modification . . . . .	3
PSYC 214, Social Interaction . . . . .	3
PSYC 221, Psychology in Business & Industry . . . . .	3
PSYC 250, Developmental Psychology . . . . .	3
PSYC 270, Abnormal Psychology . . . . .	3
SOC 110, Intro to Sociology . . . . .	3
■ SOC 202, Minorities & Race Relations . . . . .	3
SOC 214, Social Interaction . . . . .	3
■ SOC 412, Sociology of Sex Roles . . . . .	3

**Category 6: Wellness (W) . . . . . 2**

- Required is a two-credit course focused on wellness that integrates at least two of the following areas of lifelong wellness: emotional well-being, nutrition, physical activity, and psychological development.

CDFS 182, Wellness and Aging . . . . .	3
CDFS 242, Couples, Marriages, and Families . . . . .	3
HD&E 220, Individual & Family Wellness . . . . .	2
HNES 111, Wellness . . . . .	3
HNES 250, Nutrition Science . . . . .	3
HNES 270, Consumer Issues in Food & Nutrition . . . . .	3
HPER 100, Concepts of Fitness & Wellness . . . . .	2
HPER 217, Personal & Community Health . . . . .	3
NUTR 240, Principles of Nutrition . . . . .	3

- Indicates that the course is also approved for Category 7: Cultural Diversity (D)

- This requirement may be met by 3 credits taken in any department as part of the 37 credits required for general education in a course approved for cultural diversity.

- Indicates that the course is also approved for Category 8: Global Perspectives (G)

- This requirement may be met by 3 credits taken in any department as part of the 37 credits required for general education in a course approved for global perspectives.

\*FREN 201, GERM 201 and SPAN 201 taken prior to Fall 2005 will count toward Global Perspectives.

## General Education Category Descriptions

The following descriptions are elaborations of the general education categories approved by the University Senate.

**Communication** is the clear, precise, and purposeful exchange of information in a variety of contexts, using either written or oral means.

**Cultural diversity** focuses on the social, personal, and interpersonal effects of variety and differences among cultures.

**Fine arts**, as an integral component of the humanities, promote the appreciation of aesthetics and the expression of creativity.

**Global perspectives** focus on analysis of worldwide issues illustrating the interdependence of the world and its people.

**Humanities** systematically explore cultural and intellectual forces shaping events, individual expression, and social values.

**Quantitative reasoning** is an organized set of quantitative methods used to solve problems or extend knowledge. Quantitative methods are a set of principles and procedures that could be used to manipulate numerical data.

**Science** is an organized body of knowledge, including principles and procedures based on scientific methods, used to explain physical or biological phenomena. Social and behavioral sciences use scientific methods to analyze the behaviors, structures, and processes of individuals and groups.

**Wellness** is a dynamic and integrative process of becoming aware of healthy lifestyles, of learning to make informed choices, and of developing a balanced approach to living.

### General Education Program Assessment

General education assessment has three basic purposes:

1. To improve student learning and development by identifying the intended student outcomes for the program.
2. To provide feedback on the progress toward the intended student outcomes.
3. To use the feedback to modify aspects of the program to ensure that the outcomes are being achieved and that student learning is improved.

Assessment activities are valued at NDSU and include the participation of students. Results will not be used to penalize students or faculty. Student performance on assessment of the general education program will not become part of the transcript.

### General Education Administrative Policies

1. General education courses may be used to satisfy requirements for both general education requirements and the major, minor, and program emphases. No more than two courses from any given department may be double counted in a curriculum.
2. Departments or colleges may preclude their students from double counting general education courses.
3. Department or college requirements for graduation may exceed the minimum general education requirements.

4. Except for courses that meet the cultural diversity or global perspectives requirements, no course can fulfill the requirements for more than one general education category.
5. General education requirements can be met through the College Level Examination Program (CLEP), DANTES, International Baccalaureate (IB), departmental examinations, the Advanced Placement program (AP) of the College Entrance Examination Board, or equivalents.
6. General education requirements can be met by successful completion of a course for which an approved general education course in the same department is a prerequisite or by successful completion of an advanced course in the same department with comparable course content.
7. No general education course may be taken for graduate credit.
8. Except for courses offered only on a pass/fail basis, no courses taken to meet the general education requirements may be taken for pass/fail grades.
9. The general education minimum requirements apply to all undergraduate degree programs as well as the professional degree program in pharmacy.
10. Transfer students meet NDSU's general education "College Composition I and/or College Composition II" requirement in the lower-division Communication category if they have credit in any English course (in composition, composition and literature, or the equivalent) totaling at least 2.67 semester credits per course. Transfer students who have only partially fulfilled general education category requirements by transfer-approved courses must complete the requirements in approved courses within the NDSU deficient categories. No category credit requirement may be deficient by more than a partial semester credit. However, in the communication category, if the transfer course(s) have been evaluated as equivalent to ENGL 110, 120, and COMM 110 and total no less than eight semester credits, the lower-division category requirement has been met. The total for all general education categories must be at least 36 semester credits (39 credits effective fall 2007) for new students.

11. Students may receive placement credit for ENGL 110 based on composite ACT score and performance in ENGL 120 or equivalent.
12. A student who has completed a general education program consisting of a minimum of 36 semester credits at a regionally accredited institution and who transfers to NDSU or who pursues a second baccalaureate degree at NDSU is considered to have completed his or her lower-division general education requirements at NDSU.
13. General education courses at other accredited institutions, which do not have equivalent courses at NDSU, may be accepted in transfer as part of the general education requirements at NDSU.

### General Education Transfer

Students transferring general education credits within the North Dakota University System need to consult with advisors in their academic programs at NDSU for two reasons. First, degree requirements of individual programs and colleges at NDSU may exceed the university-wide general education requirements.

Second, meeting the university-wide general education requirements by transfer credits may not necessarily prepare students for advanced, upper-division study in an academic major at NDSU.

### North Dakota University System Transfer Agreement

The North Dakota University System (NDUS) General Education Requirements Transfer Agreement (GERTA) was established by the State Board of Higher Education to ease student transfers within the system. Although subject to revision by the board, the policies at the time of printing were the following:

1. If students have completed the general education course requirements (36 credits or more) at one NDUS institution and transfer to another NDUS institution, then the lower-division general education requirements will have been met.
2. If the general education requirements have not been completed before transferring, the general education courses from the indicated areas are applicable to an appropriate general education requirement of the institution to which they are transferred. In these cases, the number of credits required to complete the general education requirement in each area is determined by the policies of the institution to which the courses are transferred.

NDSU courses commonly accepted in transfer as general education courses at other ND University System institutions are designated in parentheses after the course title on the following list of approved courses. For example, the designation (ND: Hum) indicates general approval of that course for ND University System transfer in the humanities category. (The general education category requirements across ND University System institutions are similar, but not identical.) Students transferring from non-ND University System institutions will have their general education requirements evaluated on a course-by-course basis when they enter NDSU.

### Academic Degree Requirements

To receive a baccalaureate degree from NDSU, students must complete all of the requirements listed in this section as well as those specified for the particular degree by a college within the university. Consult the appropriate section of this bulletin for sample curricula or contact the academic department for further information on degree requirements. Degree candidates must satisfactorily complete one of the degree curricula offered at NDSU. Because curricula are subject to change annually, students are responsible for determining curricular expectations according to the following guidelines:

1. Changes in intended degrees and from the time of admission, as well as second majors and minors, must be declared to become official by providing notice to the Office of Registration and Records, 110 Ceres Hall. It is important to note that curricular requirements are subject to change annually, and students are expected to follow the curriculum in place at the time the program of study was officially declared with the university.
2. Students may follow any published curricula from the semester/year of entrance at NDSU or from the year of admission to a limited-enrollment program, whichever applies, to the year of graduation provided enrollment at NDSU has not been discontinued for more than one year.
3. Students who change their majors, minors, or type of degree are subject to meeting the

requirements in effect during the academic year in which the new curriculum was declared. Students may follow any published curricula from the year the new curriculum was declared to the year of graduation provided enrollment at NDSU has not been discontinued for more than one year.

- Students who advance in limited-enrollment programs will have their academic program/plan status changed accordingly by the appropriate academic department.
- Any student who discontinues enrollment at NDSU for more than one year is subject to meeting the curricular requirements in effect at the time of re-entry.

Each program of study presented by a candidate for the baccalaureate degree is audited for meeting the degree requirements by the Office of Registration and Records. Degree candidates are certified by the Office of Registration and Records according to total credits earned, institutional grade-point average, and other university-wide requirements.

### **Baccalaureate Degrees**

A degree is the title that the university confers on a graduate who has completed university requirements for that degree. NDSU confers the following degrees at the undergraduate level:

- Bachelor of Accountancy (B.Acc.)
- Bachelor of Architecture (B.Arch.)
- Bachelor of Arts (B.A.)
- Bachelor of Fine Arts (B.F.A.)
- Bachelor of Landscape Architecture (B.L.A.)
- Bachelor of Music (B.Mus.)
- Bachelor of Science (B.S.)
- Bachelor of Science in Nursing (B.S.N.)
- Bachelor of University Studies (B.U.S.)

### **Second Degree**

A second baccalaureate degree may be earned at NDSU with all of the following provisions:

- All curriculum requirements are satisfactorily completed.
- A 30-credit minimum is earned in residence beyond all of the credits and degree requirements for the first baccalaureate degree. All requirements for both degrees must be met, including the separate residency requirements at NDSU for each (36 for the first; 30 for the second). Any repeated courses do not count toward the 30 credits.
- Each degree must be different, with one exception. More than one Bachelor of Science degree may be earned in different specified fields in engineering.

### **Majors and Minors**

Majors and minors are integral parts of baccalaureate degree curricula, particularly of those curricula that are largely elective.

**Major:** A major is a planned grouping of related courses that totals a minimum of 24 credits. Specific curriculum requirements for majors may be acquired from the appropriate departmental office or from Registration and Records, 110 Ceres.

**Minor:** A minor is a similar grouping of courses that totals a minimum of 16 credits. A minimum of eight credits must be earned in residence at NDSU. Students must have their minor(s) verified. Verification forms are available in the Office of Registration and Records, 110 Ceres, and most academic departmental offices. Completed forms must be signed by the department chair and submitted to 110 Ceres by or before the time of degree application. Because students are responsible

for following the requirements in place at the time a minor is officially declared with the university, they are encouraged to declare their intended minors early.

**Double Major:** A double major may be earned by completing the requirements of two majors offered under the same baccalaureate degree. At least 15 unique credits must exist between the two majors. Double majors lead to a single degree. When requirements for both majors are met concurrently, both majors are displayed on the diploma.

A second major, or minor, may be completed and recorded on the student's academic record after the degree for the first major has been awarded. When majors under different degrees are involved, the requirements for a second degree apply.

### **Certificates**

A certificate program is a specialized course of study requiring at least 16 credit hours at the undergraduate level or eight credit hours at the graduate level. Certificates may be earned while in pursuit of a degree or as stand-alone programs of study. Prospective students who are interested in certificate programs, but who are not seeking a degree, must be accepted to the university. Contact the Office of Admission or the Graduate School for further information. Curricular requirements and verification forms are available in academic departments offering certificates. Completed forms must be signed by the appropriate department chair (and the Graduate School, if applicable) and submitted to 110 Ceres in order for the certificate to be posted to a student's academic record and official documentation issued.

### **Exceptions to Academic Program Requirements**

Academic policies and requirements are designed to ensure that programs at NDSU are consistently of high quality. All university requirements prescribed by the University Senate must be met. Students may request substitutions or waivers for college or departmental requirements when extenuating circumstances prevail.

Students should initiate such requests with the Office of Registration and Records. Reasons for the request along with supporting evidence must be provided. In cases where deviation from the requirements might affect a student's eligibility to enroll in a particular course, the student should begin the process early during the previous term to ensure timely processing.

### **Graduation Requirements**

In fulfilling graduation requirements, there are two sets of requirements to meet: university-wide requirements, which include the general education requirements which all students must complete, and college-level requirements, which include requirements for completing majors and minors. College-level and department-level requirements for majors and minors are listed in the college sections of this bulletin under the appropriate college listing.

- Academic major: Satisfactorily complete all requirements of the curriculum in which one is enrolled and earn a minimum total of 122 credits in approved course work. Requirements for some academic majors exceed this minimum.
- General education requirements: Satisfactorily complete the general education requirements as specified earlier in this section. General education requirements are an integral part of the program requirements.
- Scholastic standing: A minimum institutional grade-point average of 2.00 based on work taken at NDSU for which grades have been assigned is required for graduation. When a course is

taken and repeated at NDSU, only the last grade and credits earned will be used in computing the cumulative grade-point average; however, all attempts appear on the transcript. Some academic programs include more specific grade-point requirements for program components or special credentials.

- Upper-level credit requirements: At least 37 of the credits presented for graduation must be in courses taken at the 300 and 400 level.
- Residence requirements: Resident credits include credits registered and paid for at NDSU while attending courses offered on campus, in Tri-College, or via distance education. Subject to approval by the college and department in which the student is majoring, credits earned through designated programs (e.g., field trips, internships, co-op education, study abroad, and capstone or exchange programs) sponsored by NDSU or originating from the NDSU campus may be accepted for all or part of the resident credit. The last 30 credits must be earned in residence.
- Transfer Students: A transfer student must earn a minimum of 60 semester credits from a four-year institution. Of these, at least 36 must be NDSU resident credits as defined above. Within these 36 resident credits, minimum requirements include 15 semester credits in courses numbered 300 or above (37 upper-level credits must still be earned in total) and 15 semester credits in the major field of study.
- Financial obligations: Satisfy all financial obligations owed to the university.
- Application for degree audit: A Graduation Audit Request postcard will be sent to students' home address (as listed in Campus Connection) from the Office of Registration and Records according to total degree credit requirements. Students should complete and return the card to ensure timely receipt of an audit listing the requirements remaining for completion of the degree and program requested.
  - For 122-150 total credits, file after completing 75 credits
  - For 151-165 total credits, file after completing 95 credits
  - For 216-229 total credits, file after completing 120 credits
- Application for degree: All candidates for a baccalaureate degree must indicate their intent to graduate when registering for their last semester. The application forms are available in the Office of Registration and Records, 110 Ceres, or online at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar).

Failure to apply by the third week of the planned semester of graduation may delay the awarding of the degree until the following semester. If a student fails to complete the required courses in time for a planned graduation, the student must reapply for the next graduation.

### **Graduation with Honor**

Graduation with honor applies only to the baccalaureate degree. Graduate courses are not included in the computation. Candidates who entered NDSU as freshmen and who have earned a minimum institutional grade-point average of 3.50 will graduate with honor. Candidates with transfer credits must meet the minimum institutional grade-point average of 3.50 for all credits earned at NDSU, as well as a cumulative grade-point average of 3.50 for all credits

earned including those from transfer work. All grades and all attempts of repeated courses are included in grade-point average calculations for graduating with honor. Students who meet the above academic criteria will graduate according to one of the following honor levels:

- Cum Laude – equal to or greater than 3.50 and less than 3.70
- Magna Cum Laude – equal to or greater than 3.70 and less than 3.90
- Summa Cum Laude – equal to or greater than 3.90

### Degree Posting

Earned degrees are posted to academic records approximately three weeks following the close of the semester in which degree requirements were successfully completed, provided students declared their intent to graduate in that same term with the Office of Registration and Records.

### Diplomas

Diplomas are issued following each term and are mailed six to eight weeks following the close of the academic session in which graduation requirements have been completed. Neither diplomas nor official transcripts will be released for students who have outstanding debts owed to the university. Students are responsible for submitting any name and address corrections for diploma processing. A diploma replacement service is provided by the Office of Registration and Records for those who have lost or damaged their diploma. The cost is \$24.

### Commencement

Commencement exercises are held twice per year at the close of the fall and the spring semesters.

Students who complete graduation requirements during the summer are eligible to participate in the May commencement exercises. To participate in the May commencement exercises, students must be registered to complete all graduation requirements by the end of the summer session following the May commencement. Individual colleges may set more stringent requirements.

A student may participate in commencement only once for a particular degree. The date of graduation on the diploma will comply with the actual completion date of the degree.

Reservations for commencement must be made by the date specified by the Office of Registration and Records. Orders for caps, gowns, and hoods must be made by the date specified by the Varsity Mart. Commencement information is available at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar).

### Evaluation of Transfer Credit

A student who is admitted as a transfer from another college or university is required to have a minimum 2.00 cumulative grade-point average for all transferable work taken elsewhere. If, due to special circumstances, a student is admitted with less than a 2.00 average, that student will be admitted on academic probation. These requirements apply to returning students who have attended other institutions, as well as new transfer students. The Office of Registration and Records administers the NDSU policies governing the acceptance of credit from outside institutions. Before credits may be evaluated for specific NDSU course equivalency or application to departmental programs, transfer courses must be accepted for university credit according to the following guidelines:

1. College-level course work from regionally accredited colleges or universities is eligible for acceptance in transfer.
2. Courses accepted in transfer will not replace any grades or credits earned or repeated at NDSU. If a course is completed at NDSU and an attempt is made to repeat that course elsewhere, the credit is considered duplication and is not eligible for transfer.
3. Credit for a remedial course is not accepted for transfer if the course is remedial by definition of the transferring institution or if it is equivalent to a remedial course at NDSU. Technical or vocational course work from regionally accredited institutions may be accepted as free elective credit only.
4. Credit will be evaluated not only as it appears on the transcript, but also on the basis by which the credit was initially awarded by the sending institution. For example, credit by examination or life experience is not accepted for transfer.
5. The Office of Registration and Records determines the applicability of transfer credit toward NDSU general education requirements according to institutional and North Dakota University System guidelines, where applicable.
6. College-level credits that do not have a course equivalent at NDSU will be accepted, but may count only toward total credits. The academic department may determine whether these transfer electives may satisfy specific curricular requirements through a course substitution process. (See also General Education Administrative Policies.)
7. NDSU requires that a minimum of 37 credits toward a baccalaureate degree be earned at the junior or senior (300- and 400-level) level. Therefore, while a freshman- or sophomore-level (100- or 200-level) course transferred from an

outside institution may satisfy a specific upper-level program requirement at NDSU, that course will not be counted toward the 37- credit upper-division degree requirement.

8. Transferable courses with D grades or above will be accepted by the university; however, colleges and departments determine how courses apply toward their respective majors and programs.
9. The name of transfer institutions and total credits accepted by NDSU will be indicated on the official NDSU transcript. Individual transfer courses are not detailed on the academic record, but will be provided in a Transfer Equivalency Worksheet after admission to the university.
10. Total transfer credits are converted to semester credits.
11. Transfer grades are not recorded nor computed in the institutional cumulative GPA. They are used only for purposes of admission to the University and certain programs, as well as for determining eligibility to graduate with honor.

### Common Course Numbers

Institutions in the North Dakota University System have established common course numbers (CCN) for many courses to facilitate transfer of courses within the system. Under the CCN agreement, transfer students who have successfully completed CCN courses will not be required to retake them at NDSU. Course requirements will have been fulfilled; however, CCN courses will not fulfill residence requirements nor will 100- and 200-level courses fulfill upper-division requirements for graduation.

### Credit by Examination

Students may demonstrate evidence of college-level achievement through the use of nationally standardized tests. Competency to write these examinations may have been gained through intensive preparation in high school, extensive reading in a particular field, or other types of formal or informal preparation. A student may not repeat by proficiency testing a course that has been previously taken or failed at NDSU or another accredited institution. Score reports must be sent directly to NDSU from the awarding agency/board. School reports and student grade reports are not considered official for purposes of awarding credit by examination.

### International Baccalaureate (IB)

NDSU recognizes the International Baccalaureate program, offered at many high schools in the United States and abroad, which allows students to take examinations for credit. The examinations are offered at the standard (SL) and higher (HL) levels. In accordance with North Dakota University System policy students must receive a minimum score of four on higher-level (HL) examinations to qualify for possible awarding of credit and advanced placement, which is determined by the appropriate academic department on campus. Credit earned through IB may not be used to satisfy residence-credit requirements for graduation. A current listing of IB examinations that have been evaluated for credit and their NDSU equivalent courses is available at [www.ndsu.edu/ndsu/admission/credit\\_by\\_exam.shtml#Subject](http://www.ndsu.edu/ndsu/admission/credit_by_exam.shtml#Subject).

IB Examination	NDSU Course Equivalent	General Ed	Semester Credits
English	ENGL 220	A	3
Biology	BIOL 150/150L & 151/151L	S/L	8
Chemistry	CHEM 121/121L & 122/122L	S/L	8
Mathematics	MATH 103 & 105		6



### College Level Examination Program (CLEP)

CLEP is a national testing program sponsored by the College Entrance Examination Board (CEEB). NDSU accepts official score reports for the Subject Examinations only.

According to North Dakota University System policy, a minimum score of 50 is required to receive credit for CLEP subject examinations. If NDSU does not have an equivalent course, free elective credit may be awarded. A complete and current listing of CLEP subject examinations and their NDSU equivalent courses is available at [www.ndsu.edu/ndsu/admission/credit\\_by\\_exam.shtm#Subject](http://www.ndsu.edu/ndsu/admission/credit_by_exam.shtm#Subject).

The following CLEP policies apply at NDSU:

1. The Subject Examination should be taken prior to enrollment in the equivalent or more advanced college-level course.
2. Scores from a Subject Examination may not be used to establish credit for a course previously taken and failed or for a course in which the student is currently enrolled.
3. Six months must elapse before a Subject Examination may be repeated.
4. Credit earned through CLEP is not residence credit and may not be used to satisfy residence-credit requirements for graduation.

#### CLEP Registration and Fees:

NDSU is a national testing center for students wishing to take CLEP examinations. CLEP Examinations are computerized and administered as needed. To register for a CLEP Examination, contact the NDSU Counseling Center, 212 Ceres, 231-7671. The current fee for each of the Subject Examinations is \$80.

CLEP Examination	NDSU Course Equivalent	General Ed	Semester Credits
Freshman College Composition	ENGL 110	C	3
English Literature	ENGL 251 & 252	A	6
American Literature	ENGL 261 & 262	A	6
Analyzing & Interpreting Literature	ENGL 271		3
	Free Elective		3
French Language (Level I)	FREN 101	A/G	4
French Language (Level II)			
<b>Score of 62 required</b>	FREN 101 & 102	A/G	8
German Language (Level I)	GERM 101	A/G	4
German Language (Level II)			
<b>Score of 63 required</b>	GERM 101 & 102	A/G	8
Spanish Language (Level I)	SPAN 101	A/G	4
Spanish Language (Level II)			
<b>Score of 66 required</b>	SPAN 101 & 102	A/G	8
Prin of Microeconomics	ECON 201	B/G	3
Prin of Macroeconomics	ECON 202	B/G	3
Western Civilization I:			
Ancient Near East to 1648	HIST 101	A	3
Western Civilization II:			
1648 to Present	HIST 102	A	3
U. S. History I:			
Early Colonization to 1877	HIST 103	A	3
U. S. History II:			
1865 to Present	HIST 104	A	3
American Government	POLS 115	B	3
Intro Psychology	PSYC 111	B	3
Intro to Educational Psychology	Free Elective		3
Human Growth & Development	PSYC 250	B	3
Introductory Sociology	SOC 110	B	3
Biology	BIOL 150/150L	S/L	4
Chemistry	CHEM 121/121L	S/L	4
College Algebra	MATH 103		3
Trigonometry	MATH 105		3
College Algebra-Trigonometry	MATH 107		3
Calculus	MATH 146	R	4
Principles of Accounting	ACCT 200 & 201		6
Principles of Marketing	Free Elective		3
Principles of Management	Free Elective		3
Introductory Business Law	Free Elective		3
Info Systems & Computer Appl	Free Elective		3
Precalculus	MATH 107		3

### Advanced Placement Examination

Students from high schools that participate in the Advanced Placement Program may earn credit through examinations provided by the College Entrance Examination Board (CEEB). The examinations are administered at the conclusion of a college-level course taught in participating high schools. The scores are forwarded, upon student request, to the college of choice.

In accordance with North Dakota University System policy, a minimum score of three is required to receive credit for the following Advanced Placement (AP) examinations. If NDSU does not have an equivalent course, free elective credit may be awarded. Credit earned through AP is not residence credit and may not be used to satisfy residence-credit requirements for graduation. A complete and current listing of AP examinations and their NDSU equivalent courses is available at [www.ndsu.edu/ndsu/admission/credit\\_by\\_exam.shtm#Subject](http://www.ndsu.edu/ndsu/admission/credit_by_exam.shtm#Subject).

AP Examination	NDSU Course Equivalent	General Ed	Semester Credits
Art History	ART 210 & 211	A	6
Biology	BIOL 111/111L	S/L	4
	*w/score of 4 or 5		
	BIOL 150/150L & 151/151L	S/L	8
Chemistry	Free Elective		4
	*w/score of 4 or 5		
	CHEM 121/121L	S/L	4
Computer Science A	CSCI 160		4
Computer Science AB	CSCI 160 & 161		8
Microeconomics	ECON 201	B/G	3
Macroeconomics	ECON 202	B/G	3
Engl Lang & Comp	ENGL 110	C	3
Engl Language Exam	ENGL 112	C	4
Environmental Science	BIOL 124/124L	S/G/L	4
European History	HIST 101 & 102	A	6
French Language	FREN 101 & 102	A/G	8
French Literature	Free Elective		3
German Language	GERM 101 & 102	A/G	8
Comparative Gov & Politics	POLS 225	B/G	3
U.S. Gov & Politics	POLS 115	B	3
Human Geography	GEOG 151	B/G	3
Latin Literature	CLAS 101	A	4
	CLAS 102		4
English Lit & Comp	ENGL 220	A	3
	*w/score of 4 or 5		
	ENGL 110	C	3
	ENGL 220	A	3
Calculus AB	MATH 165	R	4
Calculus BC	MATH 165	R	4
	MATH 166		4
Music Theory	Free Elective		6
Physics B	Free Elective		8
Physics C/Mechanics	PHYS 251/251L	S/L	4
Physics C/Electricity & Magnetism	PHYS 252/252L	S/L	4
Psychology	PSYC 111	B	3
Spanish Language	SPAN 101 & 102	A/G	8
Spanish Literature	Free Elective		3
Statistics	Free Elective		3
Studio Art 2D-Design	ART 122		3
Studio Art 3D-Design	ART 124	A	3
Studio Art-Drawing	ART 130	A	3
U.S. History	HIST 103 & 104	A	6
World History	Free Elective		6

## DANTES Examinations

NDSU recognizes the DANTES examination, which was originally designed for the military as a way to provide individuals an opportunity to obtain college level credit for what they have learned in nontraditional ways. Now available for civilian use, the DANTES Test Control Officer (TCO) administers the exams on more than 560 military installations and official DSST test centers. The main users of the exams include adult education programs, U.S. Department of Defense, and two- and four-year colleges and universities. In accordance with North Dakota University System policy, students must receive a minimum score on the examinations to qualify for possible awarding of credit and advanced placement, which is determined by the appropriate academic department on campus. If NDSU does not have an equivalent course, free elective credit may be awarded. Credit earned through DANTES may not be used to satisfy residence-credit requirements for graduation. A current listing of DANTES examinations that have been evaluated for credit and their NDSU equivalent courses is available at [www.ndsu.edu/ndsu/admission/credit\\_by\\_exam.shtm#Subject](http://www.ndsu.edu/ndsu/admission/credit_by_exam.shtm#Subject).

Dantes Examination	NDSU Course Equivalent	General Ed	Credits	Score
A History of the Vietnam War	Free Elective		3	49
Art of the Western World	ART 111	A/G	3	48
Astronomy	PHYS 110	S	3	48
Business Law II	Free Elective		3	52
Business Mathematics	Free Elective		3	48
Civil War & Reconstruction	Free Elective		3	47
Contemp West Europe: 1946-1990	Free Elective		3	48
Criminal Justice	CJ 201		3	49
Drug & Alcohol Abuse	PSYC 212	B	3	49
Environ & Human: Race Save Planet	Free Elective		3	46
Ethics in America	PHIL 210		3	46
Foundations of Education	Free Elective		3	46
Fund of College Algebra	MATH 103		3	47
Fund of Counseling	Free Elective		3	45
General Anthropology	ANTH 111	B/D	3	47
Here's to Your Health	HPER 217	W	3	48
Human Resource Mgmt	Free Elective		3	46
Human/Cultural Geography	GEOG 151	B/G	3	48
Intro to the Modern Middle East	Free Elective		3	44
Intro to Business	Free Elective		3	46
Intro to Computing	Free Elective		3	45
Intro to Law Enforcement	Free Elective		3	45
Intro to World Religions	Free Elective		3	48
Lifespan Dev Psychology	PSYC 250	B	3	46
Mgmt Information Systems	Free Elective		3	46
Money & Banking	Free Elective		3	48
Organizational Behavior	Free Elective		3	48
Personal Finance	Free Elective		3	46
Physical Geology	GEOG 105	S/G	3	46
Prin of Finance	Free Elective		3	46
Prin of Financial Accounting	ACCT 200		3	49
Prin of Physical Science I	PHYS 211	S	3	47
Prin of Public Speaking	COMM 110	C	3	47
Prin of Statistics	Free Elective		3	48
Principles of Supervision	Free Elective		3	46
Rise & Fall of the Soviet Union	Free Elective		3	45
Technical Writing	Free Elective		3	46
Business Law	Free Elective		3	4

## Course Challenge

A student who is currently registered may seek credit by challenging a course. A course challenge usually consists of a special comprehensive examination; however, additional types of performance may be required for some courses. A course challenge is only permitted for courses in which the student has not previously registered for credit. Further, credits earned by course challenge will not satisfy requirements toward a graduate degree.

Procedures for pursuing a course challenge include the following:

1. Obtain a Petition for Challenge form from the Office of Registration and Records, 110 Ceres.
2. Obtain approval from the instructor of the course, chair of the department, and dean of the college. Clarify expectations of the challenge, e.g., examination only or examination plus other performance. Based on the nature of the course and content area, some courses may not be approved for challenge by the department.
3. Pay the course challenge fee at the Business Office after receiving approval for the challenge (50% of the regular credit tuition charge; not subject to tuition cap).
4. Arrange a mutually convenient date and time for the challenge with the instructor or department.
5. Upon receipt of the signed Petition for Challenge form from the department, courses successfully challenged are listed on the student's record with the notation Credit by Special Exam. Unsuccessful challenges are not recorded.

## Academic Planning and Registration

Students are advised to prepare long-range plans according to curricular guidelines for the degree program selected. Attention to such details as semester credit loads and course sequences are recommended for optimum experiences.

### Academic Year

NDSU operates on a semester system consisting of two 16-week fall and spring semesters, including final examination week. A 12-week summer session is arranged into condensed periods of standard 4-week and 8-week courses, as well as special short-term offerings. However, the total contact (class) hours are the same as the regular semesters.

### Academic Credit

A credit is a unit used to compute the amount of work required for graduation. One semester credit is equivalent to one lecture period (50 minutes) in class per week for one semester. In the case of laboratories, a minimum of two 50-minute periods per week for one semester is equivalent to one credit. Most workshops require one and one-half hours per week for one semester for one credit.

On average, students should expect to spend two hours of study or preparation for each hour spent in class. Preparation time varies for laboratories and workshops.

### Academic Advising

The academic advising program at NDSU is designed to facilitate the student's intellectual and personal growth, to assist students in using university resources, and to guide students in making informed choices regarding academic and career plans. The Office of Registration and Records operates as the centralized support center for academic advising on campus. Each of the colleges on campus has a designated staff member in Registration and Records who serves as a liaison to support and facilitate faculty advising activities.

Following admission to NDSU, each student is assigned an advisor who is usually a faculty member in the department in which the student is majoring. If a major has not been declared, an assignment is made with a faculty member who serves as an advisor for the College of University Studies. An advisor assists a student in selecting courses to ensure a well-balanced education and helps interpret university and college policies and requirements. However, students are fully responsible for their academic decisions including selecting courses, meeting course requisites, corequisites/prerequisites, and adhering to policies, procedures, and deadlines.

Because of the diverse student population at NDSU, other advisory services are provided to meet special needs. Refer to the sections on Student Programs and Services and Special Instructional Support Programs for descriptions of additional services.

## Registration

Registration is required of all who attend classes. Dates and deadlines for advising and registration are made available in the NDSU Academic Dates and Deadlines pocket calendar and are posted online at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar).

**Online Registration.** Enrolled students may register online via Campus Connection, NDSU's student information system. Registration instructions are posted online at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar) each term.

**On-site Registration.** On-site registration is provided for new students and for those who are unable to or who choose not to register online. For registration purposes, students are grouped into the following three general categories:

**Currently enrolled students:** Currently enrolled students are assigned registration times according to total credits earned. Registration usually begins during the eleventh week of a prior regular semester. Registration for summer session should be completed during the previous spring at the same time as registration for fall semester. The advising period, known as Advising Week, begins one week prior to registration. The most current listing of classes is available on Campus Connection. An electronic version of the schedule also is available online at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar) prior to advising week. Students should see their advisor before they register. Those who do not may have an advisor hold placed on their records thereby preventing registration.

**Returning students:** Returning students are those who have not been in attendance for at least one full regular semester. Returning students are assigned registration times according to total credits earned after the Reactivation Form, or Petition for Readmission is received and processed in 110 Ceres.

**New students:** Detailed information regarding orientation and registration options is sent to new students from the Office of Orientation and Student Success. Transfer students may register early and will be assigned registration times according to the number of credits accepted in transfer to NDSU.

## Dual Career Registration

- Graduate students who wish to enroll in undergraduate course work must follow the procedure below that most closely matches their academic intent:
  - If undergraduate course work is a prerequisite or condition of admission to a graduate program of study, obtain approval from the Graduate School. This course work will appear on an undergraduate record.
  - If undergraduate course work is to be applied to an undergraduate program in which the student plans to enroll concurrent with a graduate program of study, submit either an Undergraduate Application for Admission (if never enrolled as undergraduate at NDSU) or Reactivation Form (if previously enrolled as an undergraduate at NDSU). This course work will appear on an undergraduate record.
  - If undergraduate course work is to be applied to a graduate program of study (select programs only), obtain approval from the Graduate School. This course work will appear on a graduate record.
- Undergraduate students who wish to enroll in graduate course work must follow the procedure below that most closely matches their academic intent:
  - If graduate course work is to be applied to a graduate program of study, student must be admitted to the Graduate School. This course work will appear on a graduate record.
  - If graduate course work is to be applied to an undergraduate program of study, departmental permission is required. This course work will appear on an undergraduate record.

Forms and instructions for ensuring that undergraduate and graduate course work are applied to the appropriate academic career records are available at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar).

## Changes in Registration

Following are instructions and deadlines for registration for standard-length fall and spring semester courses. **Deadlines for variable length and summer session courses are reduced proportionately.**

### Adding Courses/Sections

Students may add standard length courses to their schedules via Campus Connection during the first seven class days of a regular semester.

As of the eighth business day of the semester, an authorized "Class Permit" for each course to be added must be acquired from the department offering the course and submitted to the Office of Registration and Records along with a completed "Request for Change of Registration" form.

### Dropping Courses/Sections

**No-record drops.** Through the first 15 business days from the semester start date, students may drop a standard-length course from their schedule without it appearing on their academic record.

**Record (W) drops.** Students may continue to drop courses after the no-record drop deadline. However, such drops will be recorded on student transcripts with a W. The last date to drop courses during a regular semester is 10 business days prior to the first

day of final examinations. W indicators do not affect grade-point averages, but may be counted in attempted credits for financial aid satisfactory academic progress.

### Auditing Courses

An auditor may attend classes only as a listener, without privilege of participation in regular class exercises and may be admitted to classes only with a class permit and official registration as an auditor. No credit is received for audited courses, and "AU" appears on the transcript. A student cannot fail an audit; however, an instructor may assign a "W" (withdrawn) for non-attendance.

A student may drop a regularly registered course and add it as an audit course by submitting a "Class Permit" and processing a "Request for Change of Registration" form no later than the end of the third week from the semester start date. Once the audit registration is processed, the decision cannot be reversed. An audit fee is one-half of the regular tuition rate and is not subject to the tuition cap.

### Instructor's Drop Policy

Instructors have the option to drop students who have not attended the first week (and in some cases, the first meeting) of a lecture or laboratory. However, this option is seldom exercised by departments or instructors. Students are responsible for all course registration activity and should drop courses that they do not intend to complete. Failure to drop courses by posted deadlines may result in failing grades at the end of the term. Administrative course drop requests by departments are processed by the Office of Registration and Records.

### Cancellation of Registration

Students who register and then find it impossible to attend NDSU before the semester start date must cancel their registration by submitting a Cancellation Form available at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar) or by writing to P.O. Box 5196, NDSU, Fargo, ND 58105, faxing 231-8959, or stopping in the Office of Registration and Records, 110 Ceres. Cancellations will not be accepted by telephone. Further, it is not possible to cancel registration or to drop an only or last course online.

### Withdrawal to Zero Credits

Students who have registered and then wish to drop all courses after the semester start date must officially withdraw from the university. Failure to initiate the withdrawal process may result in "F" grades and financial obligations that otherwise might be avoided. Refer to the section on Financial Information for refund deadlines. Procedures to withdraw from all courses include the following:

- Read and complete the brochure entitled "Withdrawing to Zero Credits," available at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar).
- Contact the Counseling Center/Disability Services if assistance is needed in addressing academic, personal, financial, or other concerns.
- Withdrawals are processed at the Business Office, 101 Old Main, from 8:15 a.m. to 3:30 p.m. on regular working days.
- Students are responsible for any unpaid bills at the time of withdrawal.
- The deadline for withdrawals is the tenth business day prior to the first day of final examinations. Withdrawals after this date will not be processed without evidence of a compelling reason or circumstances beyond the student's control. Courses already completed at the time of withdrawal from a term will be withdrawn as well.

## Classification of Students

Undergraduate degree-seeking students are classified according to the progress made toward the completion of the requirements of the curriculum in which they are registered.

<i>Classification</i>	<i>Completed Credits</i>
Freshman	fewer than 27
Sophomore	27 - 59
Junior	60 - 89
Senior	90 or more

Credit limitations may be placed on students who have not been fully admitted to a degree program at NDSU:

**Undergraduate special student:** One who is not seeking a degree or has not completed the formal application process for admission. A maximum of 15 credits may be completed while under special status.

**Conditional graduate standing:** One who holds a baccalaureate degree and shows potential for successful graduate study, but does not meet all requirements for admission or has deficiencies in prerequisite course work. A maximum of 12 credits may be completed while under conditional status. Students may, in consultation with their major advisor, request a change to full graduate standing after demonstration of specified capability in graduate studies.

**Graduate non-degree standing:** One who holds a baccalaureate degree from an institution of recognized standing may enroll as a non-degree student. This category is for individuals who desire to pursue study beyond the baccalaureate degree for personal growth and improvement of skills, but not in order to work toward an

advanced degree objective. No more than 10 credits taken under non-degree status with a grade of B or higher may be transferred to any official program of study should there be a decision to seek degree classification. Students who decide to pursue full graduate admission are expected to complete the full application process.

**Note:** Non-degree and special students may not represent the university in any extracurricular activities nor join any student organization to which co-curricular eligibility rules apply.

### Eligibility for Co-Curricular Activities

Unless granted special permission by the Vice President for Student Affairs, students must fulfill the following to be eligible to participate in any public program or public contest: satisfy entrance requirements, be classified, be registered for and successfully carrying at least 12 college credits during the current semester, and have earned at least 12 college credits in residence during the semester of last previous attendance.

### Student Credit Load

The standard credit load for undergraduate students is 15-18 hours per semester during the regular academic year. A minimum of 12 credits per semester is required to be considered a full-time undergraduate student (graduate students, 9 credits). Students are limited to 20 credits per semester (summer session, 15 credits). Students who find it necessary to exceed the credit limit must have an NDSU minimum institutional grade-point average of 3.0 to be eligible to petition for an overload. Petition forms are available in the Office of Registration and Records, 110 Ceres, or online at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar).

### Mid-Term Grades

Upon request, all instructors shall inform students directly of their approximate mid-term grades before the end of the eighth week of the semester.

### Final Examinations

Final examinations in one-credit courses are usually given during the last regular class period. Final examinations for all other courses are scheduled by the Office of Registration and Records and may not be rescheduled during the final examination period. According to State Board of Higher Education policy, the examination period is instructional time and, if a final examination is not given, some instructional use of this period is expected. Final examinations for summer school, variable length, and distance and continuing education classes are arranged by the instructors.

No student shall be obligated to take more than three final examinations scheduled for the same calendar day. In the event that a student has four or more final examinations on the same calendar day, the student shall notify the instructor(s) from the highest numbered course(s) no later than two weeks before the last day of class to schedule a make-up examination to be administered at a mutually acceptable time.

Only one exam or quiz per course may be given during the last two weeks of the semester (prorated accordingly for variable length courses), which includes finals week. Exceptions include summer classes, self-paced/correspondence courses, make-up exams, courses in which laboratory is incorporated with a lecture, one-credit courses, and quizzes that account for less than 5% of the students' overall grade. If a professor chooses to give an exam during the last week of classes, he/she is expected to make some instructional use of the final examination time.

### Class Attendance

Attendance in classes is expected, and may be required by the instructor. If attendance is required, and will impact grading, it is the responsibility of the instructor to clearly communicate that policy to students.

### Student Records

#### Grades and Honor Points

The quality of student work is indicated by a letter grade. In computing scholastic averages, each letter grade is assigned a specific number of honor points for each credit earned. Student work is reported in terms of grade-point average for the term and institutional grade-point average for the composite of work at NDSU. Calculations are based on the following:

Grade Descriptions	Honor Points for Each Credit
<b>Passing grades</b>	
A Excellent	4.0
B Good	3.0
C Average	2.0
D Passing	1.0
P Pass (D or better) undergraduate	*
S Satisfactory (C or better) graduate	*
W Withdrew	*
AU Audit	*

#### Nonpassing Grades

F Failure	0.0
I Incomplete	*
U Unsatisfactory	*

#### Honor Points for Each Credit

\* Not calculated in grade-point average, except for WF and repeated courses in determining eligibility to graduate with honor.

### Grade-Point Average Calculation

Institutional cumulative grade-point average is calculated by dividing the total number of honor points earned at NDSU by the total number of credit hours in which honor points were recorded, including grades of F. NDSU GPA calculations do not include developmental course work that does not count toward the graduation requirements nor does it include course work/grades accepted in transfer. Refer also to pass/fail grading and repeated courses.

### Pass-Fail Grading

Pass-fail grading is available in any given course; however, the pass/fail option may not be used for courses taken to meet general education requirements, unless the course is only offered pass/fail. Students are advised to check degree-program restrictions regarding acceptance of pass/fail credits. Request forms may be acquired in departmental offices of advisors and in the Office of Registration and Records. Forms must be signed by the student's advisor. Pass/fail policies include the following:

1. Students are limited to a total of 16 credits under the pass/fail grading option. Courses that are offered only for pass/fail grading for all students who enroll are not included in the 16-credit limitation.
2. Approval for the pass/fail option must be filed in the Office of Registration and Records the first three weeks of the regular semester. Variable length and summer courses have prorated deadlines according to actual course length.
3. Once a pass/fail request has been approved and filed, it cannot be changed back to a regular grade.
4. A grade of P is without honor points and is not included in the grade-point computation; however, a grade of F is included in the grade-point computation.
5. If a course is taken for a regular grade, it cannot be repeated on a pass-fail basis.

### Grades of Incomplete

Under extraordinary circumstances and at the discretion of the instructor, a student may be assigned a grade of Incomplete (I). These following policies apply to Incomplete grades:

1. The grade of Incomplete is assigned to indicate that satisfactory work has been completed up to within five weeks of the semester end, and that circumstances beyond the student's control prevented completion of the work. The time period is proportional for variable length courses and summer session.
2. The grade of Incomplete is not to be given in any instance where the student has a deficiency of more than five weeks of work including final exam week. The time period is proportional for variable length courses and summer session.
3. Grades of Incomplete are initiated by student request. The student must contact the instructor, request an Incomplete grade, and, upon instructor approval, make arrangements to complete the work.
4. The grade of Incomplete (I) is an administrative grade that may only be entered by the Office of Registration and Records, except in courses designated as practicum, internship, individual study, field experience, or study abroad.
5. An Incomplete Grade Reporting Form detailing the work to be completed, expected completion date, and grading standard is to be signed and dated by both the instructor and the student. The form is to be submitted to the Office of Registration and Records by the grade submission deadline for the semester in which the course was taken. It is advisable that the instructor, student and advisor retain copies of this form for their records as well.
6. Grades of Incomplete, including those for most course types identified in #4, must be removed no later than the end of the seventh week of the next full semester (fall or spring). The time period is proportional for variable length courses and summer session.
7. Grades of Incomplete are removed when the student has completed all course requirements and the instructor of the course files a Grade Reporting Form with the Office of Registration and Records.
8. All grades of Incomplete that are not removed within the specified time are automatically changed to F grades by the Office of Registration and Records.
9. Instructors may specify completion deadlines for remaining work on the Incomplete Grade Reporting Form earlier than the standard deadlines.
10. Requests for extensions beyond the seventh week of the next full semester require approval by both the instructor and the chair of the department offering the course. The extended deadline must be indicated on the Incomplete Grade Reporting Form and may not exceed two Incomplete conversion/deadline cycles. If a grade is not submitted by the specified deadline, the Incomplete grade will convert to a grade of F.

11. Grades of Incomplete, which convert to grades of F, earned in the last semester of attendance by a student who leaves the University for two or more years may be changed to Withdrawn (W) upon re-enrollment. Requests for this privilege must be filed with the Office of Registration and Records during the first term of re-entry.
12. An Incomplete grade may be converted to a letter grade (or P/F, S/U) according to the above guidelines, but may not be expunged from the record.
13. Students may not register in courses in which they currently hold grades of Incomplete, except for courses that are repeatable for credit.
14. Students are not allowed to graduate with unconverted Incomplete grades on their academic records. Upon graduation, unconverted Incomplete grades will convert to grades of F. If a course in which an Incomplete grade was assigned is required for graduation, the instructor may extend the deadline according to the above procedures and timelines, and graduation will be postponed.
15. Students who receive grades of Incomplete or converted grades of F may appeal disputed grades in accordance with NDSU Policy, Section 337: Grade Appeals Board.

### **Course Failures**

The grade of F may not be removed by special examination or transfer credit. When a grade of F has been received in any given course, credit for that course may be earned only by re-enrolling in it and completing it satisfactorily. As with all repeated courses, the original grade will remain on the academic record, but only the latest attempt will be computed in grade-point average calculations.

### **Grade Appeals**

A course grade is considered final unless an appropriate appeal is filed by the student. For the student who has reason to believe the grade issued is incorrect, the following appeal procedure steps are provided by the university.

1. A student must initiate a request for change of a grade with the instructor within three (3) weeks of the time the grade was awarded.
2. The student must consult the following persons in order as listed and proceed to the next only after an unsatisfactory resolution of the conflict continues: (a) the instructor, (b) the department chair, and (c) the dean or a designated college committee. In the event that the instructor is also the department chair or dean, he or she need only be consulted in the capacity of instructor.
3. The instructor must be informed of all proceedings that occur in relation to any continuing consultations taken in step 2.
4. Both the instructor and the student have the right at any time during the proceedings to call a meeting of all persons involved in submitting and considering the complaint and, optionally, to invite the Grade Appeals Board to send an observer to that meeting.
5. In the event of an unsatisfactory resolution of the conflict within the college, the student may submit a formal written appeal to the Grade Appeals Board. Such an appeal must be made within six (6) weeks after the start of the regular academic semester following the semester for which the grade was awarded. For more complete details on hearing procedures, consult the publication entitled "Rights & Responsibilities of Community: A Code of Student Behavior" available in 368, Memorial Union.

### **Repeated Courses**

If students wish to take advantage of the repeated course opportunity to improve a grade, then that course must be repeated at NDSU, with one exception only. NDSU students may register for a Tri-College course to repeat a course previously taken at NDSU. If a course is completed at NDSU and an attempt is made to repeat that course elsewhere, the credit is considered duplication and is not eligible for transfer.

When a course is repeated at NDSU, all attempts remain on the academic record but only the credits, grades, and related honor points for the most recent attempt will be used in calculating the cumulative grade-point average and counted toward credits for graduation. However, all credits attempted and grades received will be used in computing graduation with honor. Students forfeit the previous grade no matter what grade is earned when the course is repeated.

All repeated courses are noted on the transcript to indicate the course was repeated in a following term and excluded from cumulative totals.

Courses taken for regular A-F grades may not be repeated for pass-fail grades.

The course-repeat option to improve one's academic record is available only to students who have not graduated.

### **Academic Forgiveness**

A former NDSU student who has not completed a baccalaureate degree and has not been in attendance at NDSU for six (6) or more years, but who is presently enrolled at NDSU, may request to exclude for grade-point-average calculations all grades earned in selected full terms (quarters or semesters) completed at NDSU prior to the six-year interval.

The courses and grades for the terms selected will remain on the student's academic record, but grades will be excluded from grade-point average calculations. Excluded courses cannot be used to satisfy any academic requirements. A student may exercise this option only once by submitting a written request to the Office of Registration and Records.

### **Transcripts**

Transcript requests must be submitted in writing and include the student's signature. The NDSU Transcript Request form is available at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar). According to federal law, telephone requests cannot be honored nor can requests from others on behalf of the student. A request for a transcript of credits by a student who is in debt to the university will not be honored until the indebtedness has been paid. The transcript only includes detailed work completed at NDSU. Requests for transcripts of work completed elsewhere must be made directly with the respective institution.

### **Correction of Transcript Errors**

Students may access their grades online at the end of each term approximately one week after the last day of final examinations. If a student becomes aware of an error in recording on the transcript, the student should first contact the instructor to verify the grade. If the error is a result of a change of grade or is in cumulative total calculations, students should submit appeals to the Office of Registration and Records, 110 Ceres. See also the section on Grade Appeals.

### **Scholastic Standards**

Academic progress is measured by grade-point average and credits earned. Students receive acknowledgment for high academic achievement and are given early warning when they become academically deficient.

### **Academic Honesty**

The primary responsibility of the students, faculty, and administration is to create an atmosphere where the honesty of individuals will not be questioned.

Faculty members are responsible for providing guidelines concerning cheating and plagiarism at the beginning of each course, and should use precautionary measures and security in cases where cheating is likely to occur.

Students are responsible for submitting their own work. Students who cooperate on oral or written examinations or work without authorization share the responsibility for violation of academic principles, and the students are subject to disciplinary action even when one of the students is not enrolled in the course where the violation occurred. Students have the right to be informed when they are suspected of violating academic principles and have the right to a fair opportunity to refute them.

Faculty have the prerogative of determining the penalty regarding prohibited academic conduct in their classes and may recommend a disciplinary sanction to the dean of the college.

For complete information regarding disciplinary sanctions, appeal procedures, and hearing guidelines, refer to [www.ndsu.edu/policy/335.htm](http://www.ndsu.edu/policy/335.htm).

### **Dean's List**

To be eligible for inclusion on the Dean's List for any given semester, a student must have earned a grade-point average of no less than 3.50 during that term while completing at least 12 semester hours (nine hours during the summer) in graded course work using traditional grades that carry honor points. The student may not have any grades of Incomplete for the semester. The Dean's List is only maintained for undergraduate students.

### **Academic Probation and Suspension**

To be eligible to register continuously without conditions, a student must maintain good academic standing. The following scholastic standards, relative to completed credits and institutional (NDSU) grade-point average, determine a student's academic standing:

<b>Minimum GPA</b>	<b>Completed Credits</b>
1.75 (freshman)	fewer than 27
1.90 (sophomore)	27-59
2.00 (junior & senior)	60 or more

Records of all students are examined at the end of each grading period. Students failing to meet the scholastic standards are subject to review by the Student Progress Committee of the college in which they are matriculated. Recommendations of the respective college committees are subject to further review by the University Committee on Academic Standards. Committee actions relate to the following:

#### **Grading Period**

NDSU has three grading periods (terms) per academic year: fall semester, spring semester, and summer semester.

#### **Grade-Point Average (GPA)**

Semester or term GPA refers to the grade-point average for any given grading period. Cumulative GPA refers to the grade-point average for all grading periods completed at NDSU.

**Academic Warning**

An academic warning is to alert a student that the semester GPA for the most recent term was below the minimum required for good standing for the student's classification. An academic warning does not appear on the academic record. An academic warning is issued for the following:

1. A freshman whose GPA is less than 1.75 upon the completion of the first term of residence at NDSU.
2. A student who transferred in good standing whose GPA is deficient upon completion of the first term of residence at NDSU.
3. A student who has been in residence two or more terms and has an acceptable institutional GPA, but whose semester GPA is deficient.

**Academic Probation**

An academic probation is a formal warning that a student's institutional GPA is below minimum standards for the student's classification. Students placed on academic probation may enroll for no more than 16 credits for the following semester or 12 credits for the following summer session without permission of the college dean. An academic probation does not appear on the student's official academic record for terms fall 2005 or later. A student on academic probation must see an advisor. An advisor hold will be placed on the student's record. Academic probation is issued for the following:

1. A student who entered the grading period in good standing and has been in residence two or more terms, but whose institutional GPA is deficient for the student's classification.
2. A student who entered the grading period on academic warning and whose institutional GPA is deficient for the student's classification.

**Continued Probation**

Continued probation is a formal extension of the initial academic probation status and is issued when the institutional GPA is still below minimum, but adequate progress is made by attaining the minimum GPA for the term for student classification. Students placed on continued academic probation may enroll for no more than 16 credits for the following semester or 12 credits for the following summer session without permission of the college dean. Continued probation does not appear on the student's academic record for terms fall 2005 and later. Students placed on continued probation must see an advisor. An advisor hold will be placed on the student's record.

**Continued probation may be issued for the following:**

A student who entered the grading period on academic probation and whose institutional GPA is still deficient for the student's classification, but the semester GPA is at or above the minimum. A continuance may be granted to a maximum of three (3) consecutive probationary terms.

**Academic Suspension**

Academic suspension may be issued when the academically deficient student does not demonstrate an improvement in his or her institutional GPA. Registration for the following full semester or for summer courses that are completed prior to the start of the standard eight week session will be canceled. A student may not be considered for readmission for two grading periods following an academic suspension. An academic suspension appears on the student's academic record. Academic suspension may be issued after two or more terms in residence for the following:

1. A student who entered the grading period on either probation or continued probation whose semester GPA and institutional GPA are both deficient for the student's classification.
2. A student who entered the grading period on continued probation for the third consecutive probationary term and whose institutional GPA is still deficient for the student's classification.

**Suspension Appeals**

A student who has been suspended may appeal the suspension if there were extraordinary circumstances beyond the student's control. Following the imposition of suspension, appeals must be submitted in writing at the Office of Registration and Records no later than the close of business on the semester start date (or the first day of the standard 8-week summer courses) following the imposition of suspension.

**Suspended Students**

NDSU honors suspensions of other institutions. Further, students suspended from NDSU or any other institution may not transfer course work into NDSU that was completed during the suspension period. Transfer and returning students who fail to report all previous college work are subject to dismissal or loss of credit or both.

**Readmission**

To be considered for readmission, suspended students must sit out for at least two grading periods and file a Petition for Readmission in the Office of Registration and Records at least 30 days prior to the beginning of the semester in which readmission is sought. If the petition is approved by the Committee on Academic Standards, the student may register, but will be readmitted on probation. Students who have been enrolled in courses at another institution since leaving NDSU must arrange for an official transcript to be sent to the Office of Registration and Records before readmission will be considered. However, courses/grades earned from another institution during the suspension period will not be considered for transfer unless prior approval is granted through an appeals process.



# COLLEGE OF AGRICULTURE, FOOD SYSTEMS, AND NATURAL RESOURCES

[www.ag.ndsu.edu/academics/](http://www.ag.ndsu.edu/academics/)

Kenneth F. Grafton, Dean

Morrill Hall 315 (701) 231-8790

D.C. Coston, Vice President for Agriculture and University Extension

Academic programs in the college open doors to exciting and rewarding opportunities in agriculture, food systems, and natural resources. Agriculture provided the foundation upon which NDSU was established in the late 1800s. NDSU's primary mission — to serve people — has not changed over the years. Focus on people has been central to our success as a land-grant institution. Today, the college continues to fulfill that mission through teaching, research, and outreach to people of the region and around the world.

## Mission and Values

The college provides relevant and challenging academic programs that prepare students to capitalize on current and future opportunities. Programs focus on agriculture, life, and environmental disciplines and on related social and economic fields.

The college values the ongoing development of diverse human and natural resources. It values excellence in teaching/learning, and the ongoing adaptation of quality programs to support partnerships with agricultural industries.

Demand for graduates with expertise in the college's many disciplines continues to grow. Career opportunities for men and women are expanding into new areas made possible by new technologies and a more comprehensive global perspective.

Food safety and security, biotechnology and genetics, sustainable production and land stewardship, bio-energy and bio-products, and human/animal health are emerging national priorities. Faculty conduct basic and applied research in these and many other areas. Students can participate in research and benefit from state-of-the-art equipment in the classrooms. Students get hands-on learning opportunities in laboratories, in field experiences, and through business partners across the region.

## Degree Programs

The college offers the Bachelor of Science degree for all majors and the Bachelor of Arts as an optional degree in economics.

Students must meet the following basic requirements to qualify for the Bachelor of Science degree:

	Credits
Program Core Requirements	24
First-Year Experience	1
Orientation Course	1
Quantitative Reasoning*	3
Written & Oral Communications*	12
Includes nine general education credits and three credits involving active participation in writing/speaking.	
Science & Technology*	20
Humanities & Fine Arts*	6
Social & Behavioral Sciences*	6
... A three-discipline minimum is recommended across 12 credits in the two preceding categories.	
Wellness*	2

\* Refer to general education requirements. Elements may vary with changes to university requirements.

Candidates for the Bachelor of Science degree must complete a minimum of 128 credits in one of the majors in the college. They also must satisfy the requirements of the university. Detail is provided on core requirements and options for each major. Check with advisors and consult the fact sheet for each program. ([www.ag.ndsu.edu/academics](http://www.ag.ndsu.edu/academics))



The pre-veterinary medicine program does not result in a B.S. degree. Students are urged to select an additional major area of study. (Refer to Veterinary and Microbiological Sciences; Animal and Range Sciences.)

## Minors

Approved minors are available in certain academic areas.

## Affiliated Programs

A major in agricultural and biosystems engineering is offered by the College of Engineering and Architecture. The College of Human Development and Education offers a major in agricultural education. These majors rely on the expertise and resources from the College of Agriculture, Food Systems, and Natural Resources.

## Graduation Status

Most majors are designed for completion in four years. Graduation status review is available to students each semester beginning after 75 credits are earned. ([www.ndsu.edu/ndsu/deott/forms/gradchecklist.pdf](http://www.ndsu.edu/ndsu/deott/forms/gradchecklist.pdf))

## Graduate and Professional Schools

The college's academic programs are excellent preparation for continued formal education in graduate school programs and in professional schools such as law schools and medical schools. For more information on graduate level opportunities at NDSU see: [www.ndsu.edu/gradschool](http://www.ndsu.edu/gradschool).

## Honor System

A student-elected honor system recognizes the ability of students to govern themselves. The honor system, in place since 1955, provides an enhanced learning environment. All students enrolled in agriculture courses are required to uphold the honor system. ([www.ag.ndsu.edu/academic](http://www.ag.ndsu.edu/academic))

## Scholarships

Students who have declared a major in the college are eligible for scholarships through their major department and the dean's office. Scholarships are awarded to students who have demonstrated excellence in their work, high interest in pursuing a career in an agricultural field, and involvement in university and community activities. About one-fourth of students in the college receive scholarships. Students are encouraged to contact their major department for scholarship opportunities.

## Student Organizations

Nearly 30 agriculture-related clubs and organizations provide opportunities for students to develop leadership, teamwork, interpersonal and communication skills. ([www.ag.ndsu.edu/academics](http://www.ag.ndsu.edu/academics))

## Field Experience, Internships, Cooperative Education

Students gain practical experience and credits by enrolling in a supervised field experience (internship) offered through individual departments. Another option, offered by the Career Center, provides undergraduate and graduate students with career-enhancing experiences and academic credits through the Cooperative Education program. ([www.ndsu.edu/career\\_center/students/cooperative\\_education.php](http://www.ndsu.edu/career_center/students/cooperative_education.php))

The number of cooperative education credits allowed for graduation varies by program, but should not exceed six for any program in the college.

## International Study

The college encourages students to gain international perspectives in their studies. Besides study abroad, students might consider adding the international studies major to their program in the college. Additional information is available from departmental offices or through the university's Office of International Programs. ([www.ndsu.edu/International/IntlSt/ism.shtml](http://www.ndsu.edu/International/IntlSt/ism.shtml))



## General Agriculture Major

The degree program in general agriculture is designed to serve students who wish to pursue a college education in a broad area of agriculture or who want to tailor a program to meet their specific career objectives. Traditionally, students interested in careers focusing on agricultural production follow this program of study.

Students electing to graduate with a General Agriculture major must file a "plan of study" with the General Agriculture Coordinating Committee by the third week of the second semester of the junior year. This plan of study must include a "statement of goals" or why a tailored degree is desired and an outline of courses to be taken to meet their stated career goals. Identification of the capstone course and any internship that the student plans to take also is to be included in the plan of study.

## Recommended '06-07 Curriculum General Agriculture Major

	<i>Credits</i>
Major.....	42
Required: a minimum of 12 credits in two Ag disciplines and 9 credits in two disciplines.	
Basic & Applied Sciences.....	20
Required: CHEM 121, CSCI 114 <b>or</b> 116, MATH 103 <b>or</b> 104, PLSC 315, & STAT 330	
Written & Oral Communications.....	12
Required: COMM 110, ENGL 110, 120, & 320	
Social/Behavioral Sciences & Humanities.....	12
Required: Six credits in Humanities	
Agricultural Science Electives.....	12
Free Electives.....	26
<b>Other</b>	
AGRI 150, Ag Orientation.....	1
AGRI 189, Skills for Academic Success.....	1
Wellness.....	2
<b>Curriculum Total.....</b>	<b>128</b>

## General Agriculture Minor

A minor in general agriculture may be obtained by satisfactorily completing 24 credits with at least six credits in each of any four disciplines offered by the College of Agriculture, Food Systems, and Natural Resources. The minor is intended for students who are majoring in a college other than Agriculture, Food Systems, and Natural Resources. A minimum of eight credits must be taken at NDSU.

## General Agriculture Exploratory Program (Non-Degree Program)

The exploratory program in general agriculture is intended for students who know they are interested in agriculture but are undecided on a major. This program is designed to expose students to various agricultural disciplines and, thereby, various career options. New students are encouraged to enroll in at least three introductory courses in different agricultural majors in their freshman year in addition to completing general education requirements in English, math, chemistry, social and behavioral sciences, and humanities. By following the exploratory program, students may be easily phased into a specific discipline by the end of their sophomore year. About 85 percent of entering students selecting general agriculture initially will transfer to a specific discipline.

## Recommended '06-07 Curriculum Exploratory General Agriculture (Non-Degree Program)

<i>First Year</i>	<i>Credits</i>
Agricultural Sciences <sup>1</sup> .....	8-12
Basic Sciences <sup>2</sup> .....	7
English.....	6
Mathematics.....	3
Orientation/Skills for Success.....	2
Social & Behavioral Sciences.....	6
<b>Second Year</b>	
Agricultural Sciences <sup>1</sup> .....	10-12
Basic Sciences <sup>2</sup> .....	10
Computer Science.....	3
Social & Behavioral Sciences, & Humanities & Fine Arts.....	3-6
Speech Communication.....	3
Wellness.....	2
Free Electives.....	3
<i>1 Agricultural science courses recommended include AGECE 242 or 244; AGED 232; ASM 115 or 125; ARSC 114 or 123; CS 210; ECON 201, ENT 210 or 350; MICR 202 and 202L; PLSC 110, 111, 210 and 211, or 225; PPTH 324; or SOIL 110. Students are encouraged to select at least one course within each discipline.</i>	
<i>2 Basic science courses in biology, botany, chemistry, entomology, microbiology, or zoology are recommended.</i>	

Advisors for students in the exploratory program are selected from the various disciplines in agriculture. These faculty members work with students to develop an appropriate plan of study and assist them in exploring various career opportunities. Once the student identifies the discipline of choice, an advisor in that discipline should be selected by the student.

## Department of Agribusiness and Applied Economics

[www.ndsu.edu/agecon](http://www.ndsu.edu/agecon)

Programs in agribusiness and agricultural economics apply economic principles to the use of private and public resources to provide a safe and affordable food supply, to maintain a sustainable agricultural and natural resource base, and to manage natural and environmental resources for current and future generations. Students in economics develop a solid foundation for analyzing how a society solves such problems as what goods and services to produce, how to organize production, and for whom goods and services are to be produced.

As the global population grows and the world's economies become more interdependent, economic principles become increasingly important for problems facing the agribusiness industry. Students interested in careers in agribusiness have several options. Beginning in their sophomore year, students take courses in management, marketing, and finance, all concentrating on the unique aspects of food system economics. Specialization in upper division courses permits students to concentrate in areas of particular interest: management, finance, or marketing.

Students in Agricultural Economics may focus on management, finance, and marketing in agriculture and food systems. However, the Agricultural Economics program allows students greater flexibility in selecting courses best fitting their career objectives and personal interests. This major requires a broader background in the agricultural sciences, with courses from other departments in the College of Agriculture, Food Systems, and Natural Resources providing students the scientific basis for applying economic concepts to decision problems in food systems. The Agricultural Economics major is ideally suited for students with

career objectives in production agriculture, in farm and natural resource policy analysis, or in industries providing service to agriculture.

Besides being invaluable for understanding contemporary political, economic, and social issues, students majoring in Economics are well-prepared for careers in business, law, education, public administration, and research. The Economics major is in high demand, as students and employers recognize the need to understand global trends in order to contribute to private and public economic decisions. Economics courses cover a wide range of applications and theory in managerial economics, labor markets, economic development, micro- and macroeconomics, market structure, natural resources and environmental economics, and globalization and trade.

The department offers minors in Economics and in Agribusiness.

## Curriculum Options

The Department of Agribusiness and Applied Economics offers three majors: (1) Agribusiness, (2) Agricultural Economics, and (3) Economics.

## Agribusiness Major

Agribusiness students choose one of three areas of specialization:

**Management:** This option provides students with a broad background, preparing them for general career alternatives in agribusiness.

**Finance:** This option prepares students for careers in agribusiness finance, agricultural lending, financial institution management, accounting, insurance, and investment.

**Marketing:** This option prepares students for careers in agricultural marketing, sales, or food product marketing.

### *In the agribusiness program:*

1. Students are exposed to a range of methods useful in agribusiness decision-making. Agribusiness graduates will master problem-solving skills to face challenges likely to be encountered in their professional careers.
2. Agribusiness students are required to participate in an internship during their studies. Employers continue to place high importance on work-related experience when they evaluate potential employees. Employers are assured that all NDSU agribusiness graduates have gained this valuable work experience through the required internship.
3. Collaboration with the College of Business Administration leads to the concurrent satisfaction of one of the minors offered by the College of Business Administration. Students may select business courses for the minor that complement their agribusiness interests.

## Recommended '06-07 Curriculum Agribusiness Major

<i>First Year</i>	<i>Credits</i>
MATH 146, Applied Calculus I.....	4
AGRI 150, Agriculture Orientation.....	1
AGRI 189, Skills for Academic Success.....	1
COMM 110, Fund of Public Speaking.....	3
ECON 201, Prin of Microecon.....	3
ECON 202, Prin of Macroecon.....	3
ENGL 110, 120, College Composition I, II.....	6
Agricultural Science Elective.....	3
Natural Science Elective with Lab.....	4
Wellness.....	2
Free Elective.....	3
<b>Total.....</b>	<b>32</b>

<i>Second Year</i>	<i>Credits</i>
ACCT 200, 201, Elements of Accounting I, II. . . . .	6
AGEC 242, Intro to Agricultural Management . . . . .	4
AGEC 244, Agricultural Marketing . . . . .	3
AGEC 246, Intro to Agricultural Finance I . . . . .	4
STAT 330, 331, Intro Stat, & Regression Analysis. . . . .	5
Agricultural Science Electives . . . . .	3
Communication or Foreign Language Electives . . . . .	6
<b>Humanities &amp; Fine Arts:</b>	
Cultural Diversity Elective . . . . .	3
Total. . . . .	34

<i>Third Year</i>	
AGEC 339, Quant Methods & Decision Making . . . . .	3
AGEC 344, Agriculture Price Analysis . . . . .	3
AGEC 346, Agricultural Finance II . . . . .	3
ECON 341, Intermediate Microeconomics . . . . .	3
ECON 343, Intermediate Macroeconomics . . . . .	3
Agricultural Science Electives . . . . .	3
Business Minor Electives . . . . .	9
Humanities & Fine Arts Elective . . . . .	3
Total. . . . .	30

<i>Fourth Year</i>	
AGEC 445, Agribusiness Industrial Strategy . . . . .	3
AGEC 491/496, Internship . . . . .	3
Agribusiness Area Courses (incl. capstone)* . . . . .	6
Business Minor Electives . . . . .	9
Free Electives . . . . .	11
Total. . . . .	34

**Curriculum Total. . . . . 128**

\* Course requirements vary depending upon the program option. Further information is available from the Department of Agribusiness and Applied Economics.

### Agribusiness Minor

The Agribusiness minor is a two-track minor (Agribusiness and Corporate Agribusiness) that exposes students to applications of fundamental business concepts in an agricultural or food systems setting. The Agribusiness track is a 17 credit minor that primarily draws on courses in Agribusiness and Agricultural Economics and emphasizes Agribusiness applications throughout its curriculum. The Corporate Agribusiness track is a 21 credit minor that emphasizes principles and courses applicable to corporate business. The Corporate Agribusiness track is restricted to students whose major is in the College of Agriculture, Food Systems, and Natural Resources. The Agribusiness track is open to all NDSU majors. A minimum of eight credits must be taken at NDSU.

**Agribusiness track curriculum:** ECON 201, AGEC 242, AGEC 244, AGEC 246, and at least three additional credits from any 300-400 level course in Agribusiness and Applied Economics.

**Corporate Agribusiness track curriculum:** ECON 201, ACCT 102, BUSN 340, 350, and 360, three additional credits from any 300-400 level course in the Department of Agribusiness and Applied Economics, and three additional credits from any 300-400 level course in the Department of Management, Marketing, and Finance.

### Agricultural Economics Major

Core requirements in the Agricultural Economics major include introductory courses in agricultural management, finance, and marketing. Students may choose to take all of the advanced courses in the department, yet flexibility allows building a program based on a student's individual career goals. A total of 10 courses must be taken in agribusiness or agricultural economics, plus four additional courses in micro- and macroeconomics.

## Recommended '06-07 Curriculum Agricultural Economics Major

<i>First Year</i>	<i>Credits</i>
MATH 146, Applied Calculus I. . . . .	4
AGRI 150, Agriculture Orientation . . . . .	1
AGRI 189, Skills for Academic Success . . . . .	1
COMM 110, Fund of Public Speaking . . . . .	3
ECON 201, Prin of Microeconomics. . . . .	3
ECON 202, Prin of Macroeconomics . . . . .	3
ENGL 110, 120, College Composition I, II. . . . .	6
Agricultural Science Elective. . . . .	3
Natural/Physical Sci Elective with Lab . . . . .	4
Wellness . . . . .	2
Total. . . . .	30

<i>Second Year</i>	
ACCT 200, 201, Elements of Accounting I, II. . . . .	6
AGEC 242, Intro to Agri Management . . . . .	4
AGEC 244, Agricultural Marketing . . . . .	3
AGEC 246, Intro to Agricultural Finance I . . . . .	4
ECON 341, Intermediate Microeconomics . . . . .	3
STAT 330, 331, Intro Stat, Regression Analysis . . . . .	5
Communication or Foreign Language Electives . . . . .	6

<i>Humanities &amp; Fine Arts:</i>	
Cultural Diversity Elective . . . . .	3
Total. . . . .	34

<i>Third Year</i>	
AGEC 339, Quant Methods & Decision Making . . . . .	3

<i>Choose one course:</i>	
AGEC 342, Farm & Agribusiness Management II . . . . .	3
AGEC 344, Agriculture Price Analysis. . . . .	3
AGEC 346, Agricultural Finance II . . . . .	3

<i>Choose one course:</i>	
AGEC 375, Applied Agricultural Law . . . . .	3
AGEC 484, Agricultural Policy . . . . .	3

<i>Choose one course:</i>	
ECON 324, Money and Banking. . . . .	3
ECON 343, Intermediate Macroeconomics. . . . .	3
Agricultural Science Electives . . . . .	3
Humanities & Fine Arts Elective . . . . .	3
Free Electives . . . . .	14
Total. . . . .	32

<i>Fourth Year</i>	
Agricultural Economics Capstone. . . . .	3
Agricultural Economics Electives . . . . .	9
Free Electives . . . . .	20
Total. . . . .	32

**Curriculum Total. . . . . 128**

### Economics Major

Economics is the social science that deals with problems of scarcity. Economics provides a systematic and logical framework for analyzing how a society solves such problems as what goods and services to produce, how to organize production, and for whom goods and services are to be produced. Knowledge of economics is necessary for understanding and dealing with such topics as inflation, unemployment, international trade and monetary systems, economic growth, government finance, and various forms of market regulation. Besides being important for understanding contemporary political, economic, and social issues, economics is invaluable in developing career skills for business, law, teaching, public administration, and research. Both verbal and mathematical training are involved in learning economics.

### Degree Programs

Undergraduate students majoring in economics may choose either the Bachelor of Arts degree or the Bachelor of Science degree. During the freshman year, both programs require courses such as English, mathematics, and science. Introductory courses in economics include (a) microeconomics, which is the study of relative prices, the consequences of

different market forms, and consumer behavior; (b) macroeconomics, which includes study of the general level of prices, employment, and output.

Areas of specialization may emphasize such fields as money and banking, international economics, labor, industrial organization, environmental and resource economics, or public finance.

Requirements for the Bachelor of Arts degree include two years of one foreign language. For the Bachelor of Science degree, students are required to select a minor of study from another discipline.

### Career Choices

Economics majors are employed in virtually every area of the economy. In banks and financial institutions they forecast market activity, exchange rates, and interest rate movements. In industrial firms they forecast sales, evaluate changes in cost conditions, analyze changes in international economic conditions, and provide data needed for critical decisions.

Governments are among the largest employers of economists because agencies rely on the skills of these professionals to evaluate proposed projects and policies and review tax policies. Virtually no other academic major offers the diversity in employment opportunities and flexibility among careers as does the study of economics.

A background in economics provides students with a set of versatile skills that will not become outdated with introduction of new technology.

## Recommended '06-07 Curriculum Economics Major

<i>First Year</i>	<i>Credits</i>
COMM 110, Fund of Public Speaking . . . . .	3
ENGL 110, 120, College Composition I, II. . . . .	6
MATH 146, Applied Calculus I. . . . .	4
UNIV 189, Skills for Academic Success . . . . .	1
Science & Technology Electives . . . . .	8
Social & Behavioral Sciences Electives . . . . .	6
Free Elective. . . . .	3
Total. . . . .	31

<i>Second Year</i>	
ECON 201, Principles of Microeconomics . . . . .	3
ECON 202, Principles of Macroeconomics . . . . .	3
STAT 330, 331, Intro Stats, & Regression Analysis . . . . .	5
Humanities & Fine Arts/Cultural Divers Electives . . . . .	6
Minor Electives . . . . .	6
Social & Behavioral Sciences Elective. . . . .	3
Wellness . . . . .	2
Free Elective. . . . .	3
Total. . . . .	31

<i>Third Year</i>	
ECON 341, Intermediate Microeconomics . . . . .	3
ECON 343, Intermediate Macroeconomics. . . . .	3
Economics Elective. . . . .	3
English Elective . . . . .	3
Humanities & Fine Arts Electives. . . . .	6
Minor Electives . . . . .	6
Free Electives . . . . .	9
Total. . . . .	33

<i>Fourth Year</i>	
Economics Electives/Capstone . . . . .	12
Minor Electives . . . . .	6
Free Electives . . . . .	15
Total. . . . .	33

**Curriculum Total. . . . . 128**

### Economics Minor

The minor in economics complements many other majors by helping the student develop an analytical approach to understanding human events from the perspective of this discipline. The minor in economics consists of Principles of Economics (ECON 201 and 202), Intermediate Economic Theory (ECON 341 and

343), plus two elective economics courses (one elective course must be at the 400 level). A minimum of eight credits must be taken at NDSU.

## Department of Agricultural and Biosystems Engineering

[www.ageng.ndsu.nodak.edu](http://www.ageng.ndsu.nodak.edu)

### Agricultural Systems Management Major

The Agricultural Systems Management (ASM) program combines an understanding of the agricultural, biological, and physical sciences with economics, managerial, and technical skills. This understanding of science, systems management, and applications engineering can be applied to a career in the production and processing of food, feed, fiber, and fuel, and the marketing, sales, and distribution of agricultural products and services. Students focus on the application of engineering principles, the study of technology used in agriculture, and the integration of business management concepts in the agricultural, food, and closely related industries. Students complete courses in machinery principles, off-road power systems, precision agriculture, commodity handling and processing, natural resources management, electrical and electronic systems, and information and decision support technology.

Taking courses in accounting, economics, marketing, management, business law, sales, and finance develops a strong business background. Personal career objectives may be pursued through specialization in areas such as agribusiness, production agriculture, or applied technology. Students are encouraged to minor in agribusiness, business administration, communications, or another agricultural discipline.

Agricultural Systems Management graduates are typically employed in positions that provide the link between the researcher, designer, engineer, manufacturer and the consumer. Employers include: 1) companies and agencies that provide inputs, products, and services for agricultural production; 2) companies or agencies in the business of handling, storing, processing, and distributing agricultural products/commodities and processed food or non-food products; and 3) companies and agencies that supply physical and business services to rural and urban communities. This degree is ideal for those interested in careers in technical sales or management of an agriculture-related business involved in production, processing, or manufacturing. Graduates of the program are frequently self-employed as owners/operators of commercial farms, ranches and businesses. They are often also employed as crop consultants or production specialists. The flexibility of the program allows students the opportunity to tailor the curriculum to complement their career goals.

Students interested in the innovation, design, test, manufacture, and development aspects of products, processes or systems for agricultural production, food and value-added processing of commodities, or sustainable management of environmental resources should consider the Agricultural and Biosystems Engineering curriculum in the College of Engineering and Architecture.

### Recommended '06-07 Curriculum Agricultural Systems Management Major

<i>First Year</i>	<i>Credits</i>
AGRI 150, Orientation . . . . .	1
ABEN 189, Skills for Academic Success . . . . .	1
ASM 115, Fund of ASM . . . . .	3
ASM 125, Fabrication & Constr Tech . . . . .	3
ASM 496, Field Experience . . . . .	1
COMM 110 Fund of Public Speaking . . . . .	3
CSCI 114, Microcomputer Packages . . . . .	3
ENGL 110,120, College Composition I, II . . . . .	3,3
MATH 103,105, College Algebra, Trigonometry . . . . .	3,3
Humanities & Fine Arts Elective . . . . .	3

<i>Second Year</i>	<i>Credits</i>
ACCT 102, Fund of Accounting . . . . .	3
ASM 225, Computer Applications in ASM . . . . .	3
ASM 264, Natural Resource Mgt Systems . . . . .	3
ECON 201,202, Micro, Macroeconomics . . . . .	3,3
PHYS 211, 211L, College Physics I, Lab I . . . . .	3,1
PSYC 111, Intro to Psychology . . . . .	3
Agriculture/Biological Science Elective . . . . .	3
Free Elective . . . . .	3,3

<i>Third Year</i>	<i>Credits</i>
ASM 323, Post Harvest Technology . . . . .	3
ASM 373, Tractors & Power Units . . . . .	3
ASM 374, Power Units Lab . . . . .	1
ASM 378, Machinery Principles & Mgt . . . . .	3
CHEM 121,122, General Chemistry I,II . . . . .	3,3
STAT 330, Intro Statistics . . . . .	3
Agriculture/Biological Science Elective . . . . .	3
Communication Elective . . . . .	3
Wellness . . . . .	2
Electives (Specialization/Minor) <sup>1</sup> . . . . .	3,4

<i>Fourth Year</i>	<i>Credits</i>
ASM 354, Electricity & Electronic Appl . . . . .	3
ASM 454, Site Specific Agriculture . . . . .	3
ASM 475, Mgt of Agricultural Systems . . . . .	2
ASM 491, Seminar . . . . .	1
ASM 499, Hydraulic Power Princ & Applications . . . . .	3
Agriculture/Biological Science Elective . . . . .	6
Humanities & Fine Arts Elective . . . . .	3
Electives (Specialization/Minor) <sup>1</sup> . . . . .	6,3
Free Elective . . . . .	3

*1 Options/Minors (choose one)*

### Curriculum Options

#### *Agribusiness or Business Administration (16)*

Students select courses in agribusiness, business, and related areas to achieve career goals in agricultural and related business areas.

A Dealer Management Specialization within the business option is available. This specialization is designed for students who want careers as equipment dealership managers or with equipment manufacturers. Technology, agribusiness, and communications are emphasized. Requirements include a minor in agribusiness, or business administration and two paid internships with equipment dealerships. Several industry scholarships are available to students enrolled in this specialization.

#### *Production Agriculture (16)*

Students select courses in agricultural sciences and supporting areas to achieve career goals in the technical and management aspects of production agriculture systems.

#### *Applied Technology (16)*

Students select courses to enhance curriculum diversity or interests in areas such as communications, international studies, industrial management, construction management, or food processing.

### Agricultural/Industrial Equipment Option

North Dakota State University and North Dakota State College of Science (NDSCS) collaboratively offer the Ag/Industrial Equipment option in the Agricultural Systems Management program. This collaboration gives students primary experience in physical science, engineering technology, and machinery systems with complementary hands-on training in mechanized systems laboratories at NDSCS. Students complete their education at NDSU in agricultural systems management and complement their program by selecting a business specialization or minor emphasizing courses in management, sales, marketing, finance, and personnel management. Completion of one or more cooperative education or internship placements in the equipment industry also is required.

Potential positions available for graduates in this option include: salesperson, service manager, parts and inventory control manager, sales manager, territory service manager, finance manager, general manager, regional marketing representative, manufacturer's representative, district sales manager, and warranty manager.

### Recommended '06-07 Curriculum Agricultural/Industrial Equipment Option<sup>1</sup>

<i>First Year at NDSCS</i>	<i>Credits</i>
ENGL 110,120, College Composition I, II . . . . .	6
MATH 103,105, College Algebra, Trigonometry . . . . .	5
ECON 201,202, Micro & Macro Economics . . . . .	6
COMM 110, Fund of Public Speaking . . . . .	3
TECH 121, Engine Fund . . . . .	4
DTEC 122, Preventive Main/Power Trains . . . . .	3
DTEC 101, Electrical Systems . . . . .	2
DTEC 112, Intro to Diesel Engines . . . . .	3
CSCI 101, Computer Literacy . . . . .	2
Total . . . . .	34

*1 The remaining curriculum is taken at NDSU in the ASM major*

### Agricultural Systems Management Minor

A minor in Agricultural Systems Management is available to students from other majors by working with department faculty to select 16 credits in Agricultural Systems Management. A minimum of eight credits must be taken at NDSU.

## Department of Animal and Range Sciences

[www.ag.ndsu.nodak.edu/ars/templates/indexes/programindex.htm](http://www.ag.ndsu.nodak.edu/ars/templates/indexes/programindex.htm)

### Animal and Range Sciences Major

The Animal and Range Sciences major is designed to prepare students for careers in Animal Agribusiness and related fields. Course work includes biological principles, scientific relationships, management practices, marketing, and business concepts applicable to animal products, livestock production systems, and range science. For other majors related to Animal and Range Sciences see Equine Studies, Natural Resources Management, and Veterinary Technology.

### Curriculum Options

Three options are available. Each is designed to strengthen career preparation.

**Production/Business:** This option is for students interested in careers associated with the production, agribusiness, and management of animals and the products they produce.

**Range Science:** This option is for students who are interested in careers that involve the conservation and improvement of range resources. This option enables the student to meet federal employment requirements for related careers in range science.

**Science/PreVet:** This option is designed for students who are interested in specific careers that require advanced course work in the biological sciences. The option is designed to prepare students for graduate study or to provide an animal-oriented degree while meeting the course requirements for veterinary schools.

**Transfer credits:** Transfer courses with grade C or better only will be accepted for Animal and Range Sciences courses in the major.

**Major:** All animal and range sciences majors must meet the following requirements.

**Recommended '06-07 Curriculum Animal and Range Sciences Major**

<i>First Year</i>	<i>Credits</i>
AGRI 150, Agriculture Orientation . . . . .	1
AGRI 189, Skills for Academic Success . . . . .	1
ARSC 114, Intro to Animal Sciences . . . . .	3
ARSC 123, Feeds & Feeding . . . . .	3
CHEM 121, 121L, General Chemistry I, Lab . . . . .	3,1
ECON 201, Prin of Microeconomics . . . . .	3
ENGL 110, 120, College Composition I, II . . . . .	3,3
MATH 103, College Algebra . . . . .	3
PLSC 110, World Food Crops . . . . .	3
Social/Behavioral Sciences Elective . . . . .	3
Wellness . . . . .	2
Total . . . . .	32

**Options**

<i>Second, Third &amp; Fourth Years</i>	<i>Prod/</i>	<i>PreVet</i>	<i>Range</i>
<i>Bus.</i>	<i>Sci.</i>	<i>Sci.</i>	<i>Sci.</i>
ARSC 220, Livestock Production . . . . .	3	3	3
ARSC 222, Meat Animal Evaluation . . . . .	2	2	--
ARSC 225, Nat Res Agro Eco . . . . .	--	3	--
ARSC 320, 330, 331, Judging . . . . .	2	2	--
ARSC 323, Fund of Nutrition . . . . .	3	3	--
ARSC 336, Intro to Range Mgt . . . . .	3	3	3
ARSC 357, Animal Genetics . . . . .	3	3	--
ARSC 450, 452, 456, 458, 460 . . . . .	--	15	--
ARSC 463, Physiology of Reprod . . . . .	3	3	--
ARSC 463L, Physiology of Reprod Lab . . . . .	1	1	--
ARSC 470, Applied Nutrition . . . . .	4	4	--
ARSC 482, 484, 486, 488 . . . . .	4	2	--
ARSC 491, Seminar . . . . .	1	1	1
BOT 314, 380 . . . . .	--	6	--
COMM 110, Fund of Public Spkg . . . . .	3	3	3
ENGL 320, Business & Prof Writing . . . . .	3	3	3
MICR 202, 202L Intro Microbiology, Lab . . . . .	3	3	--
PLSC 315, Genetics . . . . .	3	3	3
SOIL 210, 444 . . . . .	--	8	--
VETS 135, MICR 465 . . . . .	6	3	--
ARSC Electives . . . . .	4	4	6
Biology . . . . .	3	3	4
Free Electives . . . . .	22	24	25
AGEC 242, 244 . . . . .	7	7	--
Humanities/Fine Arts Electives . . . . .	6	6	6
Organic Chemistry/Biochem . . . . .	4	7	4
Statistics . . . . .	3	3	3
<b>Curriculum Totals . . . . .</b>	<b>128</b>	<b>128</b>	<b>128</b>

**Animal and Range Sciences Minor**

Students from other majors may minor in animal and range sciences by completing 16 credits. Formal approval by the department is required. A minimum of eight credits must be taken at NDSU.

**Equine Studies Major**

The Equine Studies major is designed to prepare students for careers in the equine industry and related fields. Course work includes practical husbandry and equitation skills, scientific principles related to management of the equine, and study of the modern equine industry and business practices.

**Recommended '06-07 Curriculum Equine Studies Major**

All Equine Studies majors must meet the following requirements:

<i>First Year</i>	<i>Credits</i>
AGRI 150, Agriculture Orientation . . . . .	1
AGRI 189, Skills for Academic Success . . . . .	1
ARSC 123, Feed & Feeding . . . . .	3
BIOL 126, Human Biology . . . . .	3
CHEM 121, 121L, General Chemistry I, Lab . . . . .	3, 1
ENGL 110, 120 College Composition I & II . . . . .	3, 3
MATH 103, College Algebra . . . . .	3
PLSC 110, World Food Crops . . . . .	3
Social/Behavioral Sciences Elective . . . . .	3
VETS 135, Anatomy & Physiology of Domestic Animals . . . . .	3
Wellness Elective . . . . .	2
Total . . . . .	32

**Second, Third & Fourth Years**

AGEC 242, Intro to Agri Management . . . . .	4
AGEC 244, Agricultural Marketing . . . . .	3
ARSC 260, Intro to Equine Studies . . . . .	2
ARSC 260L, Equine Care & Mgmt Practicum . . . . .	1
ARSC 261, Basic Equitation & Horsemanship . . . . .	1
ARSC 323, Fund of Nutrition . . . . .	3
ARSC 336, Intro to Range Management . . . . .	3
ARSC 357, Animal Genetics . . . . .	3
ARSC 363, Equine Nutrition & Physiology . . . . .	3
ARSC 365, Equine Evaluation . . . . .	2
ARSC 463, Physiology of Reproduction . . . . .	3
ARSC 463L, Physiology of Reproduction Lab . . . . .	1
ARSC 480, Equine Prod & Industry . . . . .	1
ARSC 491, Seminar . . . . .	1
ARSC 494, Internship . . . . .	2
ARSC Elective . . . . .	5
CHEM 260, Elements of Biochemistry . . . . .	4
COMM 110, Fund of Public Speaking . . . . .	3
ECON 201, Prin of Microeconomics . . . . .	3
ENGL 320, Business & Professional Writing . . . . .	3
Humanities/Fine Arts/Cultural Diversity . . . . .	6
MICR 202, 202L, Intro Microbiology, Lab . . . . .	2,1
MICR 465, Fund of Animal Disease . . . . .	3
PLSC 315, Genetics . . . . .	3
STAT 330, Introductory Statistics . . . . .	3
Free Electives . . . . .	25
<b>Curriculum Total . . . . .</b>	<b>128</b>

**Equine Studies Minor**

Students from other majors may minor in Equine Studies by completing a minimum of 16 credits in the following courses. A minimum of eight credits must be taken at NDSU.

**Required (12 credits)**

ARSC 123, Feeds & Feeding . . . . .	3
ARSC 260, Intro to Equine Studies . . . . .	2
ARSC 260L, Equine Care & Mgmt Practicum . . . . .	1
ARSC 363, Equine Nutrition & Physiology . . . . .	3
ARSC 365, Equine Evaluation . . . . .	2

**Electives (4 credits minimum)**

Must include one of the following: ARSC 323, 463, or 480. Maximum of 2 credits for ARSC 196 or ARSC 496. Maximum of 4 credits for ARSC 365.



**Certificate**

A certificate in equine studies is awarded upon the successful completion of the following courses during a single academic year:

**First Semester**

<i>First Semester</i>	<i>Credits</i>
ARSC 123, Feeds & Feeding . . . . .	3
ARSC 260, Intro to Equine Studies . . . . .	2
ARSC 260L, Equine Care & Mgt Practicum . . . . .	1
ARSC 261, Basic Equitation & Horsemanship . . . . .	1
ARSC 363, Equine Nutrition & Physiology . . . . .	3
Total . . . . .	10

**Second Semester**

ARSC 361, Intermediate Horsemanship . . . . .	1
ARSC 365, Equine Evaluation . . . . .	2
ARSC 480, Equine Production & Industry . . . . .	3
Total . . . . .	6
<b>Total for Certificate . . . . .</b>	<b>16</b>

**Veterinary Technology Major**

Veterinary technology is an exciting and challenging major that offers a multitude of career opportunities in animal health care and related areas. The Veterinary Technology major leads to the B.S. degree. This major offers a well-rounded program of general and clinical studies. Graduates are prepared not only for traditional veterinary practice careers, but also for pursuit of emerging non-traditional careers through the choice of electives and minor areas of study.

The first year of the veterinary technology program is open to all interested students and offers an opportunity to explore the veterinary technology field. Advancement into the second year of the program is limited to a maximum of 30 students who are selected on a competitive basis.

The American Veterinary Medical Association accredits the veterinary technology program.

**Recommended '06-07 Curriculum Veterinary Technology Major**

<i>General Courses</i>	<i>Credits</i>
AGRI 189, Skills for Academic Success . . . . .	1
ARSC 114, Intro to Animal Sciences . . . . .	3
BIOL 150, 150L, General Biology I, Lab <b>or</b> BIOL 151, 151L, General Biology II, Lab . . . . .	3,1
CHEM 117, 117L, Chemistry Concepts, Lab <b>or</b> CHEM 121, 121L, General Chemistry I, Lab . . . . .	3,1
COMM 110, Fund of Public Speaking . . . . .	3

	<b>Credits</b>
CSCI 116, Busn Use or	
CSCI 114, Micro Packages . . . . .	4-3
ENGL 110, 120, College Composition I, II . . . . .	3,3
ENGL 320, Business & Professional Writing . . . . .	3
MATH 104, Finite Math . . . . .	3
MICR 202, 202L, Intro Micr, Lab . . . . .	2,1
MICR 465, Fund of Animal Disease . . . . .	3
PLSC 315, 315L, Genetics, Lab . . . . .	3,1
VETS 440, Zoonoses . . . . .	3
Free Electives . . . . .	20-21
Humanities & Fine Arts . . . . .	6
Social & Behavioral Sciences . . . . .	6
Wellness . . . . .	2

#### **Pre-Professional Veterinary Technology Courses**

VETS 115, Medical Terminology . . . . .	1
VETS 125, Animal Restraint . . . . .	2
VETS 130, Companion Animal Breeds . . . . .	1
VETS 135, Anat & Phys of Domestic Animals . . . . .	3
VETS 136, Anat & Phys Lab . . . . .	1
VETS 150, Intro to the Vet Profession . . . . .	1

#### **Professional Veterinary Technology Courses (limited enrollment)**

VETS 255, Fund of Vet Radiography . . . . .	3
VETS 256, Vet Clinical Tech. & Instruments . . . . .	4
VETS 259, Small Animal Diseases . . . . .	2
VETS 357, Vet Pharmacology . . . . .	3
VETS 358, Vet Surg Nurs Tech . . . . .	4
VETS 359, Vet Hosp Info & Proc . . . . .	2
VETS 385, Vet Clin Path I . . . . .	3
VETS 386, Vet Clin Path II . . . . .	3
VETS 387, Vet Clin Path III . . . . .	3
VETS 481, Ward Care/Clinic Care . . . . .	4
VETS 483, Clinical Veterinary Practicum . . . . .	4
VETS 485, Externship . . . . .	6
<b>Curriculum Total . . . . .</b>	<b>128</b>

#### **Large Animal Veterinary Technology Minor (pending approval)**

The minor in Large Animal Veterinary Technology is reserved for veterinary technology majors only. Students may earn this minor by completing a minimum of 16 credits in the following courses. A minimum of eight credits must be taken at NDSU.

<b>Required (11 credits)</b>	<b>Credits</b>
ARSC 123, Feeds & Feeding . . . . .	3
ARSC 220, Livestock Production . . . . .	3
ARSC 260, Intro to Equine Studies . . . . .	2
VETS 482, Large Animal Techniques . . . . .	3
<b>Electives (5 credits minimum)</b>	
ARSC 260L, Equine Care & Mgmt Practicum . . . . .	1
ARSC 323, Fund of Nutrition . . . . .	3
ARSC 363, Equine Nutrition & Physiology . . . . .	3
ARSC 463, Physiology of Reproduction . . . . .	3
ARSC 464, Reproductive Mgmt Procedures . . . . .	2
ARSC 480, Equine Industry & Prod Systems . . . . .	2
ARSC 482, Sheep Industry & Prod Systems . . . . .	2
ARSC 484, Swine Industry & Prod Systems . . . . .	2
ARSC 486, Beef Industry & Prod Systems . . . . .	2
ARSC 488, Dairy Industry & Prod Systems . . . . .	2
ARSC 494, Independent Study (including AI course) up to 2	

## **Interdisciplinary Program in Biotechnology**

[www.ag.ndsu.nodak.edu/plantsci](http://www.ag.ndsu.nodak.edu/plantsci)

Biotechnology is an interdisciplinary field based on a combination of biology and technology. It includes the application of science and technology to the design of new plants, animals, and microorganisms that have improved characteristics. For further information, refer to the Interdisciplinary Programs section.

## **Department of Cereal and Food Sciences**

[www.ndsu.edu/cereal-science](http://www.ndsu.edu/cereal-science)

### **Food Science Major**

The Food Science major is offered through the Department of Cereal and Food Sciences in the College of Agriculture, Food Systems, and Natural Resources. It is designed to prepare students for a career in the food industry, the "world's largest industry," which is responsible for feeding the world.

The program is structured to develop an understanding of the nature, properties, and characteristics of foods through foundation courses in biochemistry, chemistry, microbiology, physics, and other sciences. Food science courses are built on this foundation. Applications include the study of food safety, processing, preservation, sanitation, storage, and marketing of foods. The analysis and microbiological and biochemical characterization of food products also are studied. Additional elective courses in economics and business administration are available to students intending to enter a management career.

**Note:** Transfer credits in food science from other institutions must have grades of C or better to be accepted for the food science program at NDSU. The Institute of Food Technologists (IFT) approves the curriculum in the food science program. Students majoring in food science, therefore, are eligible to compete for the prestigious IFT scholarships.

The program also provides the opportunity to gain industrial experience during undergraduate study by means of industry internships.

Upon completion of the program, graduates will be able to recognize, critically analyze, and solve problems realistically in both industrial and academic environments.

### **Recommended '06-07 Curriculum Food Science Major**

<b>First Year</b>	<b>Credits</b>
AGRI 150, Ag Orientation . . . . .	1
AGRI 189, Skills for Academic Success . . . . .	1
BIOL 150, General Biology . . . . .	3
CHEM 121, 121L, General Chemistry I, Lab . . . . .	3,1
CHEM 122, 122L, General Chemistry II, Lab . . . . .	3,1
CSCI 114, Microcomputer Packages . . . . .	3
CFS 210, Intro to Food Sci & Tech . . . . .	2
ENGL 110, 120, College Composition I, II . . . . .	3,3
HNES 250, Nutrition Science . . . . .	3
MATH 146, Applied Calculus I or	
MATH 165, Calculus I . . . . .	4
Total . . . . .	31

#### **Second Year**

ECON 201, Prin of Microeconomics . . . . .	3
ARSC 340, Meat Science & Technology . . . . .	3
CHEM 341, 341L, Organic Chemistry I, Lab . . . . .	3,1
CFS 370, Food Processing I . . . . .	3
COMM 110, Fund of Public Speaking . . . . .	3
PHYS 211, 211L, College Physics I, Lab . . . . .	3,1
*Electives . . . . .	13
Total . . . . .	33

#### **Third Year**

BIOC 460, Biochemistry . . . . .	4
CFS 430, 431, Food Unit Operations, Lab . . . . .	2,1
CFS 470, 471, Food Processing, Lab . . . . .	3,1
ENGL 320, Business & Professional Writing . . . . .	3
MICR 350, 350L, General Microbiol, Lab . . . . .	3,1
STAT 330, Intro Statistics . . . . .	3
*Electives . . . . .	12
Total . . . . .	33

<b>Fourth Year</b>	<b>Credits</b>
CFS 450, Cereal Technology . . . . .	3
CFS 460, 461, Food Chemistry, Lab . . . . .	3,1
CFS 464, Food Analysis . . . . .	3
CFS 474, Sensory Science . . . . .	2
CFS 480, Food Product Development . . . . .	3
MICR 453, Food & Dairy Microbiology . . . . .	3
Electives <sup>1</sup> . . . . .	13
Total . . . . .	31

**Curriculum Total . . . . . 128**

<sup>1</sup> Electives may be chosen from approved courses to fulfill the general education requirements, and to emphasize one of the following areas: sciences, engineering, business, nutrition, or processing

## **Great Plains Institute of Food Safety**

[www.ndsu.edu/foodsafety](http://www.ndsu.edu/foodsafety)

### **Food Safety (SAFE) Major**

A number of undergraduate and graduate programs of study are offered through the Great Plains Institute for Food Safety. Food safety is an area of concern for many Americans, the current target of tremendous interest, effort, and spending worldwide, and an area in which shortages of expertise are manifest. For further information, refer to the Interdisciplinary Programs section.

## **School of Natural Resources**

[www.ag.ndsu.edu/nrm](http://www.ag.ndsu.edu/nrm)

With increasing human pressure and a growing need to balance competing demands, our world needs new and better ways to manage society's impacts on the environment. The School of Natural Resources (SNR) is dedicated to preparing students for challenging careers requiring the holistic ecological perspective and global social perspective necessary for examining and solving complex natural resources management problems. A major in Natural Resources Management is offered in collaboration with a number of academic departments and colleges on campus. For further information, refer to the Interdisciplinary Programs section.

## **Department of Plant Sciences**

[www.ag.ndsu.nodak.edu/plantsci](http://www.ag.ndsu.nodak.edu/plantsci)

### **Crop and Weed Sciences Major**

Instruction in crop and weed sciences includes field and forage crop production and management, weed science, general and plant genetics, plant breeding, experimental design, and biotechnology. The study of botany and other plant sciences, entomology, plant pathology, and soil science is basic or related to crop and weed sciences. Students may obtain either a major or minor. The Crop and Weed Sciences major or minor is intended for general use in sales, research, and technical services (crop consultant) of agribusinesses involved in seed, chemical, and other plant production and management aspects; in natural resources conservation service; by those interested in production agriculture; or as a prerequisite for graduate study.

### **Major**

Majors must meet all of the following requirements including courses in supporting disciplines.

## Recommended '06-07 Curriculum Crop and Weed Sciences Major

<i>First Year</i>	<i>Credits</i>
AGRI 150, Ag Orientation . . . . .	1
AGRI 189, Skills for Academic Success . . . . .	1
BIOL 150, 150L, Gen Biology, Lab . . . . .	3,1
BIOL 151, 151L, Gen Biology II, Lab, or BOT 372, Structure/Div/Plants/Fungi . . . . .	4
CHEM 121, 121L, Gen Chem I, Lab . . . . .	3,1
ECON 201, Prin of Microeconomics I . . . . .	3
ENGL 110, 120, College Composition I, II . . . . .	3,3
MATH 103, College Algebra . . . . .	3
PLSC 110, World Food Crops . . . . .	3
Wellness . . . . .	2

### Second, Third, and Fourth Years

#### Written and Oral Communications:

COMM 110, Fund of Public Speaking . . . . .	3
ENGL 320, Business & Professional Writing . . . . .	3
Social & Behavioral Sciences <sup>1</sup> . . . . .	3
Humanities & Fine Arts <sup>1</sup> . . . . .	6

#### Basic & Applied Sciences:

BOT 380 or ARSC 323 . . . . .	3
CHEM 122, 122L, Gen Chem II, Lab . . . . .	3,1
CHEM 240 or CHEM 260 . . . . .	3-4
STAT 330, Intro Statistics . . . . .	3

#### Crop & Weed Sciences:

PLSC 215, Weed Identification . . . . .	1
PLSC 225, Principles/Crop Production . . . . .	3
PLSC 315, 315L, Genetics, Lab . . . . .	3,1
PLSC 320, Forage Crops . . . . .	3
PLSC 323, Weed Science . . . . .	3
PLSC 446, Genetics/Plant Improvement . . . . .	3
PLSC 455, Cropping Systems . . . . .	3
PLSC 491, Sophomore, Senior Seminars . . . . .	1,1
PLSC 300-400, Electives . . . . .	4

#### Complementary Agricultural Sciences:

ENT 350, General Entomology . . . . .	5
MICR 202, 202L, Intro Microbiol, Lab . . . . .	2,1
PPTH 324, Intro Plant Path . . . . .	3
SOIL 210, Intro Soil Science . . . . .	3
Free Electives . . . . .	27-28

#### Curriculum Total . . . . . 128

<sup>1</sup> Required: 6 credits of humanities and fine arts and 6 credits of social and behavioral sciences including ECON 201. One 3-credit course must fulfill the cultural diversity requirement for general education.

## Curriculum Options

Students may select one of the following options within crop and weed sciences. Students interested in integrated pest management should follow the Weed Science option.

Students interested in biotechnology may major through the plant sciences department or complete the biotechnology option.

**Agribusiness:** This option is for students who wish to combine an agribusiness background to complement the basic crop production focus of the major. Students fulfill this option by completing the production option plus the following courses for the Agribusiness Track: Econ 201, AGECE 242, 244, 246, and 3 credits of AGECE 300-400 level.

**Biotechnology:** This option is intended for students who wish to work in the biotechnology industry or pursue graduate study in the crop biotechnology area. Students must complete BIOC 460, BOT 380, 380L, MICR 350, 350L (instead of MICR 202, 202L), plus MATH 105 or 146, and PLSC 431 or 453, and PLSC 484.

**Production:** This option is for students most interested in production agriculture. This is the most popular option with students and provides the most flexibility of course selection. Completing the basic crop and weed sciences curriculum fulfills this option.

**Science:** This option is intended for students who are interested in graduate studies and want more basic science courses as a foundation for graduate studies. BOT 380, 380L, CHEM 341, 341L, and MATH 146 must be taken under the general Basic and Applied Sciences requirements, plus 12 credits of science electives from outside the agriculture field. Suggested electives are: BIOC 460, 461, BOT 314, 460, CHEM 342, MATH 147, PHYS 211, 212, or STAT 331.

**Weed Science:** This option is intended for students interested in crop consulting or weed science areas. AGECE 375 or BUSN 431, BOT 380, PLSC 453, and PPTH 454 are required. ASM 378, BOT 314, PLSC 210, 211, and SOIL 322 are suggested electives.

**Agronomy Club:** The Agronomy Club meets twice each month. Members join in campus and community activities, arrange speakers on agricultural topics, and participate in meetings and contests at the regional and national levels. The club also coordinates tours to local agribusinesses to gain a better perspective of career opportunities. Students with an interest in agriculture are encouraged to attend, regardless of chosen major.

## Crop and Weed Sciences Minor

Students may minor in crop and weed sciences by selecting a total of 18 credits of study in crop and weed sciences or closely related fields, including PLSC 110, 225, two courses from 315 and 315L, 320, or 323, plus a minimum of five credits approved by the department. A minimum of 8 credits must be taken at NDSU, and at least six credits must be at the 300-400 level.

## Horticulture Major

Instruction and study in horticulture is focused on fruits, vegetables, turfgrass, and woody and herbaceous landscape plants, including propagation, production, culture, marketing, processing, and utilization. Horticulture encompasses the design and planting for landscapes, parks, highways, and public facilities, including interiorscapes, in rural, suburban, and urban areas. It includes skills for management of nursery, garden center, greenhouse, seed, fruit, vegetable, turfgrass, biotechnology, and specialty crop enterprises, as well as floral design and flower shops.

The Horticulture major is a four-year curriculum leading to the B.S. degree. Students also may minor in horticulture. Prospective students should consult with horticulture faculty regarding programs and options so their educational needs may best be fulfilled. Master of Science and Ph.D. degree programs also are available. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

## Curriculum Options

Horticulture majors may select one or more options of study. All of the requirements for the major and the supporting disciplines must be met to complete any horticulture option. Students may select from the following five options.

**Horticulture Biotechnology:** This option is for students who plan to engage in laboratory research or further their education in the biotechnology of horticultural crops.

**Horticulture Science:** This option is for students who plan to continue formal graduate school education leading to careers in research, teaching, and extension.

**Landscape Design:** This option is for students interested in planning, designing, and installing landscape plantings for functional and aesthetic purposes (a 16-credit minor in landscape architecture is required).

**Production Business:** This option is for students who wish to grow, market, and process horticultural crops; for example, nursery and/or greenhouse landscape, fruit, and vegetable crops.

**Urban Forestry and Parks:** This option is for students who desire a career in the management of urban forests and park-like areas, including arboreta and botanic gardens. It also includes maintenance of residential landscapes.

## Special Opportunities

**Pre-Forestry:** A student who desires to major in forestry may select a two-year pre-forestry curriculum. However, the forestry student must transfer to another institution to complete degree requirements.

**Horticulture and Forestry Club:** This club meets monthly. Members take field trips to botanical gardens, arboreta, trade shows, parks and other horticultural sites. They also are actively involved in growing and marketing flowers and foliage plants, regional and national judging contests, flower shows, and horticulture science and education programs.

## Recommended '06-07 Curriculum Horticulture Major

<i>First Year</i>	<i>Credits</i>
AGRI 150, Ag Orientation . . . . .	1
AGRI 189, Skills for Academic Success . . . . .	1
BIOL 150, 150L, Gen Biology I, Lab . . . . .	3,1
CHEM 121, 122, 121L, Gen Chem I, II, Lab I . . . . .	3,3,1
ECON 201 or 202, Prin of Micro or Macro . . . . .	3
ENGL 110, 120, College Composition I, II . . . . .	3,3
MATH 103, College Algebra (not required for Biotech Option) . . . . .	3
PLSC 210, 211, Horticulture Science, Lab . . . . .	3,1
Total . . . . .	26-29

## Horticulture Options

Second, Third, and Fourth Years

	Hort Biotech	Hort Sci	Landscape Design	Prod Busn	Urban For-Park
<b>Major:</b>					
PLSC 177, Floral Design . . . . .	--	--	2	--	--
PLSC 219, Prairie & Comm For . . . . .	--	--	--	--	2
PLSC 341, Land & Bidding & Contr . . . . .	--	--	1	--	--
PLSC 355, Woody Land Plants . . . . .	3	3	3	3	3
PLSC 360, Hort Food Crops . . . . .	4	4	--	4	--
PLSC 365, Herb Land Plants . . . . .	--	--	2	--	2
PLSC 368, Plant Propagation . . . . .	3	3	--	3	--
PLSC 375, Turf Management . . . . .	--	--	3	--	3
PLSC 412, Nursery Prod & Mgmt . . . . .	--	--	--	3	--
PLSC 422, Grnhse Prod & Mgmt . . . . .	--	--	--	3	--
PLSC 455, Cropping Systems . . . . .	3	3	3	3	3
PLSC 465, Advan Land Plants . . . . .	--	--	2	--	2
PLSC 484, Plt Tiss Cult & Micro . . . . .	2	2	--	--	--
PLSC 485, Arboriculture Science . . . . .	--	--	3	--	3
PLSC 486, Eco-Physiol of Hort Crp . . . . .	2	2	--	2	2
PLSC 491, Hort Seminar . . . . .	1	1	1	1	1
PLSC Electives . . . . .	4	4	2	0	1
<b>Agriculture:</b>					
ENT 350, General Entomology . . . . .	5	5	5	5	5
NRM 150, Nat Res Mgmt Orient . . . . .	--	--	--	--	1
PLSC 315, Genetics . . . . .	3	3	3	3	3
PLSC 315L, Genetics Lab . . . . .	1	--	--	1	1
PLSC 323, Prin of Weed Science . . . . .	3	3	3	3	3
PPTH 324, Intro Plant Pathology . . . . .	3	3	3	3	3
PPTH 455, Plant Disease Mgt or . . . . .	--	--	--	3 or	--
PPTH 456, Tree Path . . . . .	--	--	3	3	3
SOIL 210, Intro to Soil Science . . . . .	3	3	3	3	3
<b>Basic and Applied Sciences:</b>					
BOT 372, Struc/Div/Plants & Fungi . . . . .	4	4	--	4	4
BOT 380,380 L Plant Physiology/Lab . . . . .	3,1	3,1	3	3	3
BOT 460, Plant Ecology . . . . .	--	--	3	--	3
CHEM 260, Elements of Biochem . . . . .	4	4	--	--	--
CHEM 341, Organic Chemistry I . . . . .	3	3	--	--	--
CHEM 341L, Organic Chem Lab . . . . .	1	1	--	--	--
CHEM 342, Organic Chem II . . . . .	3	3	--	--	--
CSCI 116, Bus/Computers or . . . . .	4 or	4 or	4 or	4 or	4 or
CSCI 114, Microcomp Pkgs . . . . .	3	3	3	3	3
MATH 146, Calculus . . . . .	4	4	--	--	--
MICR 202, Intro Micro . . . . .	2	2	--	--	--
MICR 202L, Intro Micro Lab . . . . .	1	1	--	--	--
PHYS 120, Fund of Physics . . . . .	3	3	--	--	--
STAT 330, Intro Statistics . . . . .	3	3	3	3	3
Humanities & Fine Arts/Social & Behavioral Sciences: . . . . .					
	9	9	9	9	9
<b>Written &amp; Oral Communications:</b>					
COMM 110, Fund Public Speaking . . . . .	3	3	3	3	3
ENGL 320, Business and Professional Writing or ENGL 322, Creative Wtg . . . . .	3	3	3	3	3
<b>Related:</b>					
ACCT 102, Fund of Acct . . . . .	--	--	--	3	--
BUSN 350, Prin of Mgt . . . . .	--	--	--	3	3
BUSN 431, Busn Law I . . . . .	--	--	3	--	--
BUSN 450, Human Resource Mgt . . . . .	--	--	--	3	--
HNES 426, Parks & Rec Adm . . . . .	--	--	--	--	3
LA 331, Intro to Planting Design . . . . .	--	--	--	--	3
POLS 360, Prin of Pub Admin . . . . .	--	--	--	--	3
Wellness . . . . .	2	2	2	2	2
<b>Minor in Biotechnology:</b>					
(See Hort Biotech Option) . . . . .	11	--	--	--	--
<b>Minor in Landscape Arch:</b>					
(See Landscape Hort Option) . . . . .	--	--	16	--	--
General Electives . . . . .	11-12	12-13	8-9	16-17	9-10
<b>Curriculum Totals . . . . .</b>	<b>128</b>	<b>128</b>	<b>128</b>	<b>128</b>	<b>128</b>

## Horticulture Minor

Required Horticulture Courses Credits

PLSC 210, 211, Hort Science, Lab . . . . .	3,1
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At least three of the following four courses:

PLSC 355, Woody Landscape Plants . . . . .	3
PLSC 360, Horticultural Food Crops . . . . .	4
PLSC 365, Herbaceous Landscape Plants . . . . .	2
PLSC 368, Plant Propagation . . . . .	3

Electives from the following to total

18 credits minimum:

Any 300-400 level PLSC course, ENT 350, PPTH 324, or SOIL 210. A minimum of 8 credits must be taken at NDSU.

## Recommended '06-07 Curriculum Two-Year Pre-Forestry

First Year Credits

AGRI 150, Ag Orientation . . . . .	1
AGRI 189 Skills for Academic Success . . . . .	1
BIOL 150,150L General Biology I/Lab or BIOL 151, 151L General Biology II/Lab . . . . .	3,1
BOT 372, Struc & Div of Plants & Fungi . . . . .	4
CHEM 121, 122, 121L, Chem I, II, Lab I . . . . .	3,3,1
ECON 201, Prin Microeconomics . . . . .	3
ENGL 110, 120, College Composition I,II . . . . .	3,3
MATH 103, 105, or above, College Alg, Trig . . . . .	3,3
Wellness . . . . .	2
Total . . . . .	34

Second Year

COMM 110, Fund of Public Speaking . . . . .	3
CSCI 116, Bus/Computers or CSCI 114, Micro/Pkgs . . . . .	4/3
ENT 350, General Entomology . . . . .	5
PHYS 120, Fund Physics . . . . .	3
PLSC 219, 355, Pr & Com For, Wdy Land Pla . . . . .	2,3
PLSC 315, 315L, Genetics, Lab . . . . .	3,1
SOIL 210, Intro Soil Science . . . . .	3
Soc Sci, Hum & Fine Arts Electives . . . . .	6
Total . . . . .	32-34

## Sports and Urban Turfgrass Management Major

The Turfgrass Management program focuses on science and technology for the management of quality turf in such areas as golf courses, sports facilities, parks, and home lawns. A graduate should be competent in grass physiology, soil science, proper irrigation practices, pest control, budgeting of resources, and personnel management. Graduates may work in the turf industry, which encompasses not only turf managers, but also the production of seed, sod or other turfgrass materials, manufacturing and marketing of products for turf management, business management, manpower development, consulting, and other services.

The Sports and Urban Turfgrass Management major is a four-year curriculum leading to a B.S. degree. Students have the opportunity to minor in other programs of interest.

## Recommended '06-07 Curriculum Sports and Urban Turfgrass Management Major

*Credits*

### First Year Experience:

AGRI/UNIV 189, Skills/Academic Success	1
AGRI 150, Ag Orientation	1
Total	2

### Communication Skills:

COMM 110, Fund of Public Speaking	3
ENGL 110, College Composition I	3
ENGL 120, College Composition II	3
ENGL 320, Business & Professional Writing	3
Total	12
Humanities/Fine Arts	3
Humanities/Fine Arts:Cultural Diversity	3
Total	6

### Quantitative Reasoning:

STAT 330, Intro Statistics	3
Total	3

### Social/Behavior Science/Global Perspectives:

ECON 201 or 202, Micro/Macroeconomics	3
PSYC 111, Intro to Psychology	3
Total	6
Wellness	2

### Major Requirements:

PLSC 210, 211L, Horticulture Sci/Lab	3,1
PLSC 315, 315L Genetics/Lab	3,1
PLSC 323, Prin of Weed Sci	3
PLSC 341, Land Bid & Contracting	1
PLSC 375, Turfgrass Management	3
PLSC 381, Sports Turf Operations	3
PLSC 457, Turfgrass Sci, Ecol/Mgmt	3
PLSC 468, Golf Course Irrigation	2
PLSC 469, Golf Course Irrigation II	1
PLSC 491, Seminar	1
PLSC 496, Field Experience	2
Total	27

### PLSC Electives:

PLSC 215, 219, 296, 355, 365, 368, or 485

### Supporting Courses:

ACCT 102, Fund of Accounting	3
BIOL 150, 150L, Gen Biology I/Lab or	
BIOL 151, 151L, Gen Biology II/Lab	3,1
CHEM 121, 121L, Gen Chemistry I/Lab	3,1
CHEM 122, Gen Chemistry II	3
MATH 103, College Algebra	3
SOIL 210, Intro to Soil Science	3
SOIL 322, Soil Fert & Fertilizers	3
ENT 350 (Hort Section), Gen Entomology	5
PPTH 324, Intro Plant Pathology	3
BUSN 350, Found of Management	3
BUSN 351, Found of Org Behavior or	
BUSN 360, Found of Marketing	3
Total	37
Free Electives	28
<b>Curriculum Total</b>	<b>128</b>

**Turf Club:** The goals of the Turf Club are to provide students with opportunities to share information, connect with the turf industry, gain real world experience, and broaden their knowledge. The club organizes field trips, topic discussions, and presentations by guest speakers. Other activities include attending regional and national turf conferences, community service, and fundraising.

## Department of Soil Science

[www.soilsci.ndsu.nodak.edu](http://www.soilsci.ndsu.nodak.edu)

### Soil Science Major

Soil Science is a discipline that is fundamental to both crop production and environmental stewardship. An understanding of soil science is critical for proper tillage, fertilization, and irrigation of agronomic and horticultural crops as well as turf management. Knowledge of soil science is also essential for environmental fields such as wetland preservation, habitat restoration, land use planning, erosion control, waste disposal, sustainable land use, and identifying and solving various other environmental problems. Soil science majors find employment in production agriculture, environmental consulting, wetland assessment, regulatory agencies, and natural resource management. All majors in soil science must meet the following requirements:

### Recommended '06-07 Curriculum Soil Science Major

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
AGRI 150, Ag Orientation	1	--
AGRI 189, Skills for Academic Success	1	--
CHEM 121, 121L, Gen Chemistry I, Lab	3,1	--
CHEM 122, 122L, Gen Chemistry II, Lab	--	3,1
ENGL 110, 120, College Composition I,II	3	3
MATH 103, 105, College Algebra, Trig	3	3
PLSC 110, World Food Crops	--	3
Wellness	--	2
Free Electives	5	2
Totals	17	17

### Second Year

ASM 264, Natural Resource Mgt Sys	--	3
CSCI 114, Microcomp Pkgs,		
122, BASIC, or 126, FORTRAN	--	3
MATH 146 or 165, Calculus	4	--
PHYS 211, 211L, Gen Physics, Lab	3,1	--
SOIL 210, Intro to Soil Science	3	--
SOIL 217, Intro to Meteorol & Climat	--	3
SOIL 322, Fertility & Fertilizer	--	3
Free Electives	4	4
Totals	15	16

### Third Year

BIOL 150, Gen Biology	3	--
CHEM 240 or 341, Organic Chemistry	3	--
COMM 110, Fund of Public Speaking	--	3
MICR 202, 202L, Intro Microbiol, Lab	--	2,1
SOIL 321, Mgt & Conservation	3	--
SOIL 333, 339, Managing Soil Phys Prop, Lab	2,1	--
STAT 330, Intro Statistics	--	3
Free Electives	4	6
Totals	16	15

### Fourth Year

ENGL 215, Wtg/Work or 320, Bus & Prof Writing	--	3
SOIL 444, Soil Genesis & Survey	4	--
SOIL 455, Soil Chemistry	3	--
SOIL 480, Soil & Waste Disposal	--	2
SOIL 491, Capstone Seminar I, II	1	1
Free Electives	8	10
Totals	16	16
<b>Curriculum Total</b>		<b>128</b>

### Soil Science Minor

A minor in soil science requires a minimum of 16 semester credits. A minimum of eight credits must be taken at NDSU.

### Required courses:

SOIL 210, Intro to Soil Science	3
SOIL 444, Soil Genesis/Survey	4

*Credits*

### Choose 9 credits from the following:

SOIL 321, Soil Conservation Management	3
SOIL 322, Soil Fertility & Fertilizers	3
SOIL 455, Soil Chemistry	3
SOIL 465, Soil & Plant Analysis	3
SOIL 410, Soil & the Environment	2
SOIL 333, Soil Physical Properties	2/1
SOIL 217, Intro to Meteorology/Climatology	3
SOIL 447, Microclimatology	3
SOIL 480, Soil & Waste Disposal	2

## Department of Veterinary and Microbiological Sciences

<http://vetmicro.ndsu.nodak.edu/>

This department offers instruction in microbiology, including courses in general microbiology, pathogenic microbiology, parasitology, virology, immunology, food microbiology, microbial physiology and bacterial genetics. The department also offers courses in epidemiology, animal disease, and food safety to enhance our students' understanding of applied microbiology and infectious disease.

### Microbiology Major

Microbiology is a fundamental biological science which offers a variety of challenges and opportunities. Microbiologists have made some of the most important scientific discoveries in this century. Since 1910, approximately one-third of the Nobel Prizes in medicine and physiology have been awarded to microbiologists. The discipline covers a wide spectrum of specialized interest areas that illustrate how microbes affect human and animal health, our environment, food safety, food technology, and the biotechnology industry. In recent years, the field of microbiology has had a major impact upon virtually all other scientific disciplines. For this reason, even students who choose to major in other fields may benefit from a minor in microbiology.

Students majoring in microbiology are well prepared to enter graduate school, veterinary school, and medical school, or to establish careers in food or pharmaceutical industries, hospitals, public health agencies, universities, research laboratories, and other biomedical industries. A 2.50 institutional grade point average and a minimum grade of C in core and elective microbiology courses are required to remain in the microbiology major.





## Recommended '06-07 Curriculum Microbiology Major

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
AGRI 189 .....	1	--
BIOL 150, 150 L.....	4	--
BIOL 151, 151 L <b>or</b> other BIOL/BOT/ZOO.....	--	4
CHEM 121, 121L.....	4	--
CHEM 122, 122 L .....	--	4
COMM 110 .....	--	3
ENGL 110.....	3	--
ENGL 120.....	--	3
MATH 103 & 105; <b>or</b> 146 .....	3	--
Wellness.....	--	2
Total.....	15	16
<b>Second Year</b>		
BIOL 315, 315 L.....	--	4
CHEM 341, 341 L .....	4	--
CHEM 342 .....	--	3
MICR 350, 350 L .....	4	--
MICR 460, 460L.....	--	3,2
STAT 330 .....	3	--
General elective .....	6	3
Total.....	17	15
<b>Third Year</b>		
BIOC 460 .....	4	--
BIOC 461 .....	--	4
MICR 475.....	--	3
MICR elective .....	3	3
PHYS 211, 211 L.....	4	--
PHYS 212, 212 L.....	--	4
General elective .....	6	3
Total.....	17	17
<b>Fourth Year</b>		
MICR 445.....	--	2
MICR 470.....	3	--
MICR 471.....	2	--
MICR 480.....	--	3
MICR 482.....	3	--
MICR 486.....	--	3
MICR elective .....	1-3	1-3
Free elective .....	3	6
General elective .....	3	--
Total.....	15-17	15-17
<b>Curriculum Total.....</b>	<b>128-131</b>	

## Microbiology Minor

Students may minor in microbiology by selecting a total of 16 credits including Microbiology 350-350L. Additional credits are to be earned in other 300- or 400-level microbiology courses, Plant Pathology 460, or Safe 464 or 484. A minimum of eight credits must be taken at NDSU.

## Pre-Veterinary Medicine

NDSU offers excellent programs that prepare students for application to a college of veterinary medicine. All veterinary schools stress the importance of high scholastic standing and judge applicants on academic preparation, knowledge of the veterinary profession, experience and character.

Because the number of students admitted to veterinary schools is limited, prospective students should check the specific requirements of the college of their choice well in advance to make certain that preparatory work is appropriate.

Pre-veterinary medicine is not a specific major, and students are encouraged to pursue a major in their area of interest while at NDSU. In addition, students preparing for application to a veterinary school should consult with a pre-veterinary medicine advisor. The department is a member of the Association of American Veterinary Medical Colleges (AAVMC), which administers the Veterinary Medical College Application Service (VMCAS). Communication with pre-veterinary students is facilitated when students are enrolled in the College of Agriculture, Food Systems, and Natural Resources. Visit the VMS, Pre-Veterinary Medicine Web site for further information.

<http://vetmicro.ndsu.edu/prevet.htm>

# COLLEGE OF ARTS, HUMANITIES AND SOCIAL SCIENCES

[www.ndsu.edu/abss](http://www.ndsu.edu/abss)

Minard Hall 221 (701) 231-8338

Thomas J. Riley, Dean

The College of Arts, Humanities and Social Sciences embraces the teaching, research, creative activities and service objectives of NDSU's land grant mission, and the needs of a diverse constituency. The college is committed to:

Providing its students with the highest quality of preparation in an atmosphere that promotes intellectual rigor, critical inquiry, citizenship, and creative decision-making requisite for personal growth and professional success.

Encouraging in its faculty exemplary scholarship of teaching, research, and service, leading to significant publications, creative work and performances.

Inigorating the tradition of outreach through enriching performance, presentation, and cultural understanding.

In its vision to realize human potential and achievements, the College of Arts, Humanities and Social Sciences is guided by the qualities of creativity, ethical integrity, and mutual respect.



## B.A. or B.S. Degree

Students seeking a broad educational background may choose to complete requirements for either a Bachelor of Arts or Bachelor of Science degree. Majors available for either degree include the following:

Agricultural Communication  
 Anthropology  
 Art  
 Classical Languages  
 Criminal Justice  
 Emergency Management  
 English  
 French  
 Health Communication  
 History  
 Humanities  
 Journalism, Broadcasting  
 and Mass Communication Technology  
 Management Communication  
 Music  
 Philosophy-Humanities  
 Political Science  
 Public History  
 Public Relations and Advertising  
 Social Science  
 Sociology  
 Spanish  
 Theatre Arts

## B.S. Degree with Special Professional Intent

Students planning a specific career with a baccalaureate background are encouraged to pursue the related curriculum leading to the Bachelor of Science degree. The following major is available for the B.S. with special professional intent:

**Political Science – Public Service Option**

## B.F.A. and B.Mus. Degrees

Bachelor's of Fine Arts in theatre arts and in visual arts and a Bachelors of Music are available and are outlined under the Division of Fine Arts.

## Graduate Degree

Master's degrees are offered in emergency management, English, history, mass communication, music, political science, social science, sociology and speech communication. Ph.D.s are offered in communication, criminal justice, emergency management, history, and music. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

## Teacher Certification

Many of the majors available through the College of Arts, Humanities and Social Sciences lead to careers in teaching. Students who are interested in becoming professional educators should refer to the degree program offered through the School of Education. Teacher certification is available in the following areas: English, French, history, music\*, social science, sociology, Spanish, and speech communication.

To meet requirements of the No Child Left Behind Act of 2001, students interested in teacher education are encouraged to declare a double major in their discipline and in education (i.e. history and history education, chemistry and chemistry education). Such double majors may typically be earned by successful completion of a few additional credits. Students should contact their advisors or the Office of Registration and Records for details. Students are encouraged to declare their primary and secondary majors with the Office of Registration and Records, 110 Ceres Hall.

\* K-12 certification available; all others are secondary only.

## Degree Requirements

All degree candidates must apply for graduation through the Office of Registration and Records according to university procedures and deadlines.

A minimum of 122 credits of which at least 37 must be at the 300-400 level is required for the B.A. or B.S. degree.

Bachelor of Arts degree requirements include proficiency of one foreign language at the second-year college level. Bachelor of Science degree requirements include completion of an approved minor.

Students with two or more years of a foreign language in high school may earn advanced placement credit according to the guidelines listed in the Modern Languages section.

Students in the College may take courses under the pass/fail option for free elective credits only, with a limit of 16 hours.

All majors must complete the 37 credit university-wide general education requirements. Effective fall 2007, students entering NDSU will be required to complete an upper-level, writing-intensive course as part of the general education requirements.

An additional 12 credits are required by the College of Arts, Humanities and Social Sciences as follows:

	<b>Credits</b>
Fine Arts (art, music, theatre arts) . . . . .	3
Humanities (classical languages, English, French, German, humanities, history, philosophy, religion, Spanish) . . . . .	3
Social Science (anthropology, communication, criminal justice, emergency management, political science, sociology) . . . . .	3
Area outside the student's major . . . . .	3
Total . . . . .	12

All courses except internships may be used to fulfill these requirements.

## Field Experience Courses

1. Field Experience/Internships (496) do not meet the requirements for general education.
2. Departments may adopt either pass/fail or letter grade options for Field Experience/ Internships.
  - a) Where Field Experience/Internship credits are a requirement of a program, these credits may be graded pass/fail to satisfy requirements for a major.
  - b) Where Field Experience/Internship credits are not a requirement of a program, up to three credits may be graded pass/fail to satisfy requirements for a major.

## Cooperative Education

Cooperative Education, a program of the Career Center, offers undergraduate and graduate students an opportunity to integrate classroom study with paid, career related work experience for academic credit.

Work may be full or part time. Credit is granted through Continuing Education and awarded directly by the Cooperative Education program. A Cooperative Education experience may substantially improve students' employment opportunities after graduation.

**Right of Petition**

Students seeking deviation from any academic rules and regulations administered by the college may appeal in writing to the Committee on Student Progress.

**Pre-Professional Curricula**

Requirements for admission to most professional academic programs may be met at NDSU. The specific courses taken in a pre-professional program depend primarily upon the admission requirements of the program to which a student wishes to apply.

**Pre-Law**

Although a baccalaureate degree is a requirement for admission to law school, most law schools do not prescribe a specific undergraduate program. Emphasis is placed on the development of scholarly skills and insights rather than the mastery of a prescribed subject. Thus, the pre-law student may elect the Bachelor of Arts or Bachelor of Science degree, selecting a major or minor of special personal interest. For advisement purposes, new applicants to NDSU who indicate Pre-Law enter as Political Science Majors. (See Department of Criminal Justice and Political Science). To attain the necessary breadth of knowledge for successful practice, the student should elect the basic courses in several fields of learning. At the same time the student should avoid an elective program of only single courses in many fields, opting instead for some depth of study in each elected field.

**Interdisciplinary Programs**

The College of Arts, Humanities and Social Sciences participates in three interdisciplinary programs on campus:

**Fraud Investigation Minor**

Students in this interdisciplinary minor will study the causes of fraud, as well as the detection, investigation, and prevention of fraud. See Interdisciplinary Programs section for further information.

**Gerontology Minor**

This program provides students with an integrated understanding of the process of aging, aging services, and the aged in America. For further information, refer to the Interdisciplinary Programs section of this Bulletin.

**Women's Studies Major and Minor**

The goal of Women's Studies is to examine the contributions of women to all aspects of society, to explore the intersections of race, class, sexual orientation, age, and physical ability with gender both globally and nationally, to investigate the heritage, challenges and concerns of women, and to provide a newer and broader understanding of women in all fields. For further information, refer to the Interdisciplinary Programs section of this Bulletin.

**Department of Communication**

The Department of Communication provides majors and minors in Agriculture Communication; Health Communication; Journalism, Broadcasting & Mass Communication Technologies; Management Communication; and Public Relations & Advertising at the undergraduate level.

**Pre-Communication Preparation.** Students interested in pursuing an undergraduate degree offered by the Department of Communication are enrolled as pre-professional students and must first complete all courses and requirements associated with the Pre-Communication Preparation designation. Once all Pre-Communication Preparation courses and requirements are met, the student completes and submits the Pre-Communication form, available on the department website, to the department's academic assistant. After verification of accuracy, the student is accepted into the professional program and can continue pursuing a degree in the Department of Communication.

Students in all five majors will be required to pass with a B or higher the following courses: ENGL 120, COMM 110 OR Ill, COMM 112, COMM 114, COMM 212, COMM 216, and SOC 110 OR POLS 110 OR PSYC 111 OR CJ 201 for a total of 21 credits.

**Pre-Communication Preparation courses may be retaken only once.** Students who have not completed the entire Pre-Communication Preparation designation are prohibited from registering for 300- and 400-level classes.

**Old Majors, New Majors.** Students entering as majors in Fall 2006 must be admitted in one of the five new majors. Students enrolled in the former speech communication and mass communication majors and minors may change to one of the five new majors and minors or complete the old majors and minors before Fall of 2008. Students with fewer than 60 credits by spring 2006 (first and second year students) are expected to change their majors and minors to one of new majors and minors.

**Communication with Honors Program**

Students with a 3.25 average or higher may enroll in COMM 111, 217, and 321 and a senior seminar within the major and receive Communication with Honors designation by the department.

**Agricultural Communication Major**

B.A. or B.S. in Agricultural Communication (36 credit hours) A major/minor in agricultural communication combines the resources and expertise of two units, communication and agriculture, to produce trained communicators who can explain science, technologies, and complex agricultural issues to diverse audiences. Applicants for the major must have been accepted by NDSU as degree seeking.

The curricular structure of the agricultural communication program is listed below for students entering the program. Students will complete an applied capstone course after completing all other required coursework.

**Recommended '06-07 Curriculum**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
CJ 201 <b>or</b> POLS 110 <b>or</b> PSYC 111 <b>or</b> SOC 110, Intro to Criminal Justice <b>or</b>		
Intro to Political Science <b>or</b>		
Intro to Psych <b>or</b> Intro to Sociology . . . . .	3	--
COMM 110, Fund of Public Speaking <b>or</b>		
COMM 111, Honors Public Speaking . . . . .	3	--
COMM 112, Understanding Media/Social Change (Soc/Beh Sci Gen Ed Requirement) . . . . .	--	3
COMM 114, Human Communication (Social & Behav Sci Gen Ed Requirement) . . . . .	3	--
CSCI 122, Beg BASIC/Visual Basic (Quantitative Reasoning Gen Ed Requirement) --	3	
ENGL 120, College Composition II . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	--	1
Humanities & Fine Arts Gen Ed Requirement. . . . .	3	3

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
Science & Technology Gen Ed Requirement . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	15	15

**Second Year**

COMM/AGRI 103, Ag Communication . . . . .	--	3
COMM 200, Intro to Media Writing . . . . .	3	--
COMM 212, Interpersonal Communication (Soc & Behav Sci College Req) . . . . .	--	3
COMM 216, Intercultural Communication . . . . .	3	--
COMM 301, Rhetorical Traditions <b>or</b>		
COMM 321, Intro to Communication Theory. . . . .	3	--
COMM 310, Advanced Media Writing . . . . .	--	3
CSCI 114, Microcomputer Packages (4 cr.) <b>or</b>		
CSCI 116, Business Use of Computers (3 cr.) (Science & Technology Gen Ed Requirement) . . . . .	--	3 or 4
Humanities AHSS College Requirement . . . . .	--	3
Fine Arts AHSS College Requirement . . . . .	3	--
Science & Tech Gen Ed Requirement & Lab . . . . .	4	--
Totals . . . . .	16	15 or 16

**Third Year**

COMM 308, Business & Professional Speaking. . . . .	--	3
COMM 313, Editorial Processes . . . . .	3	--
COMM 320, Communication Analysis . . . . .	3	--
COMM 362, Principles of Design for Print. . . . .	3	--
Minor courses . . . . .	3	6
Junior-level English Composition Course. . . . .	3	--
Upper Division Units in Agriculture . . . . .	--	6
Totals . . . . .	15	15

**Fourth Year**

COMM 425, Specialty Writing . . . . .	3	--
COMM 489, Capstone in Communication. . . . .	--	3
Communication Elective . . . . .	3	3
Minor Courses . . . . .	6	3
Electives . . . . .	3	7
Totals . . . . .	15	16

**Minor in Agricultural Communication (21 credits)**

Students who are looking to minor in Agricultural Communication are required to take COMM/AGRI 103, COMM 112, 114, 200, 212, 301 or 321, 313, 308, 310, and 320.

**Health Communication Major**

B.A. or B.S. in Health Communication (36 credit hours) A major/minor in health communication is an "applied" degree aimed at providing both practitioners and future civic leaders with the knowledge they need to improve health services and public health. Applicants for the major must have been accepted by NDSU as degree seeking.

The curricular structure of the health communication program is listed below for students entering the program. Students will complete an applied capstone course after completing all other required coursework.

**Recommended '06-07 Curriculum**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
CJ 201 <b>or</b> POLS 110 <b>or</b> PSYC 111 <b>or</b>		
SOC 110, Intro to Criminal Justice <b>or</b>		
Intro to Political Science <b>or</b>		
Intro to Psychology <b>or</b>		
Intro to Sociology . . . . .	3	--
COMM 110, Fund of Public Speaking <b>or</b>		
COMM 111, Honors Public Speaking . . . . .	3	--
COMM 112, Understanding Media/Social Change (Soc/Behav Science Gen Ed Requirement) . . . . .	--	3
COMM 114, Human Communication (Social & Behav Sci Gen Ed Requirement) . . . . .	3	--
CSCI 122, Beginning BASIC/Visual Basic (Quantitative Reasoning Gen Ed Requirement) --	3	

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
ENGL 120, College Composition II . . . . .	3	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Humanities & Fine Arts Gen Ed Requirement . . . . .	3	3
Science & Technology Gen Ed Requirement . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	15	15

**Second Year**

COMM 212, Interpersonal Communication (Soc & Behav Science College Requirement) . . . . .	--	3
COMM 216, Intercultural Communication . . . . .	3	--
COMM 301, Rhetorical Traditions <b>or</b> COMM 321, Intro to Communication Theory . . . . .	--	3
COMM 380, Health Communication I . . . . .	3	--
CSCI 114, Microcomputer Packages (3 cr.) <b>or</b> CSCI 116, Business Use of Computers (4 cr.) (Science & Technology Gen Ed Requirement) 3 or 4 . . . . .	--	3 or 4
PSYC 214, Social Interaction . . . . .	--	3
Humanities AHSS College Requirement . . . . .	--	3
Fine Arts AHSS College Requirement . . . . .	3	--
Science & Tech Gen Ed Requirement & Lab . . . . .	--	4
Additional Course (Humanities, Soc Science <b>or</b> Fine Arts outside of major) . . . . .	--	3
Totals . . . . .	16 or 17	15

**Third Year**

COMM 320, Communication Analysis . . . . .	3	--
COMM 381, Patient-Provider Communication . . . . .	3	--
COMM 474, Communication Campaigns . . . . .	--	3
COMM 480, Health Communication II . . . . .	3	--
Minor Courses . . . . .	3	6
Junior-level English Composition Course . . . . .	3	--
Upper Div Units in Health <b>or</b> Health Related Course . . . . .	--	6
Totals . . . . .	15	15

**Fourth Year**

COMM 489, Capstone in Communication . . . . .	--	3
Minor Courses . . . . .	6	3
Upper Divi Units in Health <b>or</b> Health Related Course . . . . .	3	--
Electives . . . . .	6	7
Totals . . . . .	15	13

**Minor in Health Communication  
(21 credits)**

Students who are looking to minor in Health Communication are required to take COMM 112, 114, 212, 216, 301 or 321, 320, 380, 381, 474 and 480.

**Journalism, Broadcasting,  
and Mass Communication  
Technologies Major**

*(with Tracks in Journalism, Broadcasting, and Web-based Technology)*

B.A. or B.S. in Journalism, Broadcasting, and Mass Communication Technologies (36 credits). A major/minor in Journalism, Broadcasting, and Mass Communication Technologies (BMCT) is designed to help students know how to use public communication media. Applicants for the major must have been accepted by NDSU as degree seeking.

The curricular structure of the journalism, broadcasting, and mass communication technologies program is listed below for students entering the program. The major consists of three tracks: Journalism, Broadcasting, and Web-based Communication. Each track has separate requirements and students must chose one track. Students will complete an applied capstone course after completing all other required course work.

**Recommended '06-07 Curriculum  
Journalism Track**

**First Year**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
CJ 201 <b>or</b> POLS 110 <b>or</b> PSYC 111 <b>or</b> SOC 110, Intro to Criminal Justice <b>or</b> Intro to Political Science <b>or</b> Intro to Psychology <b>or</b> Intro to Sociology . . . . .	3	--
COMM 110, Fund of Public Speaking <b>or</b> COMM 111, Honors Public Speaking . . . . .	3	--
COMM 112, Understanding Media/Social Change (Soc/Behav Science Gen Ed Requirement) . . . . .	--	3
COMM 114, Human Communication (Social & Behav Science Gen Ed Requirement) . . . . .	3	--
CSCI 122, Beginning BASIC/Visual Basic (Quantitative Reasoning Gen Ed Requirement) . . . . .	--	3
ENGL 120, College Composition II . . . . .	3	--
UNIV 189, Skills for Academic Success . . . . .	1	--
Humanities & Fine Arts Gen Ed Requirement . . . . .	3	3
Science & Technology Gen Ed Requirement . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	15	15

**Second Year**

COMM 200, Intro to Media Writing . . . . .	3	--
COMM 212, Interpersonal Communication (Soc & Behav Science College Requirement) . . . . .	--	3
COMM 216, Intercultural Communication . . . . .	3	--
COMM 301, Rhetorical Traditions <b>or</b> COMM 321, Intro to Communication Theory . . . . .	3	--
COMM 310, Advanced Media Writing . . . . .	3	--
CSCI 114, Microcomputer Packages (3 cr.) <b>or</b> CSCI 116, Business Use of Computers (4 cr.) (Science & Technology Gen Ed Requirement) . . . . .	--	3 or 4
Humanities AHSS College Requirement . . . . .	--	3
Fine Arts AHSS College Requirement . . . . .	3	--
Science & Tech Gen Ed Requirement & lab . . . . .	--	4
Additional Course (Humanities, Soc Science <b>or</b> Fine Arts outside of major) . . . . .	--	3
Totals . . . . .	16 15 or 16	

**Third Year**

COMM 313, Editorial Processes . . . . .	3	--
COMM 320, Communication Analysis . . . . .	3	--
COMM 362, Principles of Design for Print . . . . .	--	3
COMM 425, Specialty Writing . . . . .	3	--
Minor Courses . . . . .	3	6
Junior-level English Composition Course . . . . .	3	--
Upper Division Units in Health or Health- Related Course . . . . .	--	6
Elective . . . . .	1	15
Totals . . . . .	15	15

**Fourth Year**

COMM 434, Communication Law . . . . .	3	--
COMM 489, Capstone in Communication . . . . .	--	3
COMM 496, Field Experience . . . . .	3	--
Minor Courses . . . . .	6	3
Upper Division Units in Health or Health- Related Course . . . . .	3	--
Electives . . . . .	--	10
Totals . . . . .	15	16

**Recommended '06-07 Curriculum  
Broadcasting Track**

**First Year**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
CJ 201 or POLS 110 or PSYC 111 <b>or</b> SOC 110, Intro to Criminal Justice <b>or</b> Intro to Political Science <b>or</b> Intro to Psychology <b>or</b> Intro to Sociology . . . . .	3	--
COMM 110, Fund of Public Speaking <b>or</b> COMM 111 Honors Public Speaking . . . . .	3	--
COMM 112, Understanding Media/Social Change (Soc/Behav Science Gen Ed Requirement) . . . . .	--	3
COMM 114, Human Communication (Social & Behav Science Gen Ed Requirement) . . . . .	3	--

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
CSCI 122, Beginning BASIC/Visual Basic (Quantitative Reasoning Gen Ed Requirement) . . . . .	--	3
ENGL 120, College Composition II . . . . .	3	--
UNIV 189, Skills for Academic Success . . . . .	1	--
Humanities & Fine Arts Gen Ed Requirement . . . . .	3	3
Science & Technology Gen Ed Requirement . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	15	15

**Second Year**

COMM 200, Intro to Media Writing . . . . .	3	--
COMM 212, Interpersonal Communication (Soc & Behav Science College Requirement) . . . . .	--	3
COMM 216, Intercultural Communication . . . . .	3	--
COMM 301, Rhetorical Traditions <b>or</b> COMM 321, Intro to Communication Theory . . . . .	3	--
COMM 310, Advanced Media Writing . . . . .	--	3
CSCI 114, Microcomputer Packages (3 cr.) <b>or</b> CSCI 116, Business Use of Computers (4 cr.) (Science & Technology Gen Ed Requirement) . . . . .	--	3 or 4
Humanities AHSS College Requirement . . . . .	--	3
Fine Arts AHSS College Requirement . . . . .	3	--
Science & Tech Gen Ed Requirement & Lab . . . . .	--	4
Additional Course (Humanities, Soc Science <b>or</b> Fine Arts outside of major) . . . . .	--	3
Totals . . . . .	16 15 or 16	

**Third Year**

COMM 320, Communication Analysis . . . . .	3	--
COMM 345, Principles of Broadcast Production . . . . .	3	--
COMM 442, Info Technologies and Mass Media . . . . .	3	--
COMM 445, Advanced Broadcast Production . . . . .	--	3
Minor Courses . . . . .	3	6
Junior-level English Composition Course . . . . .	3	--
Upper Division Units in Communication . . . . .	--	6
Totals . . . . .	15	15

**Fourth Year**

COMM 489, Capstone in Communication . . . . .	--	3
COMM 496, Field Experience . . . . .	3	--
Minor Courses . . . . .	6	3
Upper Division Units in Communication . . . . .	--	6
Electives . . . . .	--	10
Totals . . . . .	15	16

**Recommended '06-07 Curriculum  
Web-based Communication Track**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b> CJ 201 or POLS 110 or PSYC 111 <b>or</b> SOC 110, Intro to Criminal Justice <b>or</b> Intro to Political Science <b>or</b> Intro to Psychology <b>or</b> Intro to Sociology . . . . .	3	--
COMM 110, Fund of Public Speaking <b>or</b> COMM 111, Honors Public Speaking . . . . .	3	--
COMM 112, Understanding Media/Social Change (Soc/Behav Science Gen Ed Requirement) . . . . .	--	3
COMM 114, Human Communication (Social & Behav Science Gen Ed Requirement) . . . . .	3	--
CSCI 122, Beginning BASIC/Visual Basic (Quantitative Reasoning Gen Ed Requirement) . . . . .	--	3
ENGL 120, College Composition II . . . . .	3	--
UNIV 189, Skills for Academic Success . . . . .	1	--
Humanities & Fine Arts Gen Ed Requirement . . . . .	3	3
Science & Technology Gen Ed Requirement . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	15	15

**Second Year**

COMM 200, Intro to Media Writing . . . . .	3	--
COMM 212, Interpersonal Communication (Soc & Behav Science College Requirement) . . . . .	--	3
COMM 216, Intercultural Communication . . . . .	3	--
COMM 301, Rhetorical Traditions <b>or</b> COMM 321, Intro to Communication Theory . . . . .	3	--
COMM 310, Advanced Media Writing . . . . .	--	3

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
CSCI 114, Microcomputer Packages (3 cr.) <b>or</b>		
CSCI 116, Business Use of Computers (4 cr.)		
(Science & Technology Gen Ed Requirement) . . . . .	--	3 or 4
Humanities AHSS College Requirement . . . . .		3
Fine Arts AHSS College Requirement . . . . .	3	--
Science & Tech Gen Ed Requirement & Lab . . . . .	4	--
Additional Course (Humanities, Soc Science or		
Fine Arts outside of major) . . . . .	--	3
Totals . . . . .	16	15 or 16

**Third Year**

COMM 260, Prin of Internet Web-Based Design . . . . .	--	3
COMM 261, Intro to Web Development . . . . .	3	--
COMM 320, Communication Analysis . . . . .	3	--
COMM 442, Info Technologies & Mass Media . . . . .	3	--
Minor Courses . . . . .	3	6
Junior-level English Composition Course . . . . .	3	--
Upper Division Units in Communication . . . . .	--	6
Totals . . . . .	15	15

**Fourth Year**

COMM 489, Capstone in Communication . . . . .	--	3
COMM 496, Field Experience . . . . .	3	--
Minor Courses . . . . .	6	3
Upper Division Units in Communication . . . . .	6	--
Electives . . . . .	--	10
Totals . . . . .	15	16

**Minor in Journalism, Broadcasting and Mass Communication Technologies (21 credits)**

Students who are looking to minor in Journalism, Broadcasting, and Mass Communication Technologies are required to take COMM 112, 114, 212, 200, 260, 301 or 321, 310, 320, 345 and 362.

**Management Communication Major**

B.A. or B.S. in Management Communication (36 credit) A major/minor in management communication is designed to train students to be effective managers and leaders in corporate environments. Applicants for the major must have been accepted by NDSU as degree seeking.

The curricular structure of the management communication program is listed below for students entering the program. Students will complete an applied capstone course after completing all other required coursework.

**Recommended '06-07 Curriculum**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
CJ 201 <b>or</b> POLS 110 <b>or</b> PSYC 111 <b>or</b>		
SOC 110, Intro to Criminal Justice <b>or</b>		
Intro to Political Science <b>or</b>		
Intro to Psychology <b>or</b>		
Intro to Sociology . . . . .	3	--
COMM 110, Fund of Public Speaking <b>or</b>		
COMM 111, Honors Public Speaking . . . . .	3	--
COMM 112, Understanding Media /Social Change		
(Social & Behav Science Gen Ed Requirement) --	3	
COMM 114, Human Communication		
(Social & Behav Science Gen Ed Requirement) .3	--	
CSCI 122, Beginning BASIC/Visual Basic		
(Quantitative Reasoning Gen Ed Requirement) --	3	
ENGL 120 College Composition II . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Humanities & Fine Arts Gen Ed Requirement . . . . .	3	3
Science & Technology Gen Ed Requirement . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	15	15

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Second Year</b>		
COMM 212, Interpersonal Communication		
(Soc & Behav Science College Requirement) . . . . .	3	--
COMM 216, Intercultural Communication . . . . .	3	--
COMM 301, Rhetorical Traditions <b>or</b>		
COMM 321, Intro to Communication Theory --	3	3
CSCI 114, Microcomputer Packages (3 cr.) <b>or</b>		
CSCI 116, Business Use of Computers (4 cr.)		
(Science & Technology Gen Ed Requirement) 3 or 4	--	
Fine Arts AHSS College Requirement . . . . .	3	--
Humanities AHSS College Requirement . . . . .	--	3
Science & Tech Gen Ed Requirement & lab . . . . .	4	--
Additional Course (Humanities, Soc Science or		
Fine Arts outside of major) . . . . .	--	3
Electives . . . . .	3	3
Totals . . . . .	16	17 or 15

**Third Year**

COMM 320, Communication Analysis . . . . .	3	--
COMM/BUSN 383, Org Communication I . . . . .	3	--
COMM/BUSN 482, Org Communication II . . . . .	3	--
COMM 484, Global Org Communication . . . . .	3	--
COMM 487, Org Power & Leadership . . . . .	3	3
Minor Courses . . . . .	3	6
Junior-level English Composition Course . . . . .	3	--
Upper Division Units in Mgmt-Related Course . . . . .	--	3
Totals . . . . .	15	15

**Fourth Year**

COMM 489, Capstone in Communication . . . . .	--	3
Minor Courses . . . . .	6	3
Upper Division Units in Mgmt-Related Course . . . . .	6	--
Electives . . . . .	3	10
Totals . . . . .	15	16

**Minor in Management Communication (21 credits)**

Students who are looking to minor in Management Communication are required to take COMM 112, 114, 212, 216, 301 or 321, 320, 383, 482, 484 and 487.

**Public Relations and Advertising Major (with Tracks in Public Relations and Advertising)**

B.A. or B.S. in Public Relations and Advertising (36 credits) A major/minor in public relations & advertising is designed to prepare students to enter these professional fields. Applicants for the major must have been accepted by NDSU as degree seeking.

The curricular structure of the public relations and advertising program is listed below for students entering the program. Students will select one of two tracks: a Public Relations track will orient students to the principles and practices of public relations as both a practice and field of study. The second track is advertising. This track will introduce students to the principles and practices of advertising. Students will complete an applied capstone course after completing all other required coursework.

**Recommended '06-07 Curriculum Advertising Track**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
CJ 201 <b>or</b> POLS 110 <b>or</b> PSYC 111 <b>or</b>		
SOC 110, Intro to Criminal Justice <b>or</b>		
Intro to Political Science <b>or</b>		
Intro to Psychology <b>or</b>		
Intro to Sociology . . . . .	3	--
COMM 110, Fund of Public Speaking <b>or</b>		
COMM 111, Honors Public Speaking . . . . .	3	--
COMM 112, Understanding Media/Social Change		
(Social & Behav Science Gen Ed Requirement) --	3	
COMM 114, Human Communication		
(Social & Behav Science Gen Ed Requirement) .3	--	
CSCI 122, Beginning BASIC/Visual Basic		
(Quantitative Reasoning Gen Ed Requirement) --	3	
ENGL 120 College Composition II . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Humanities & Fine Arts Gen Ed Requirement . . . . .	3	3
Science & Technology Gen Ed Requirement . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	15	15

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
CSCI 122, Beginning BASIC/Visual Basic		
(Quantitative Reasoning Gen Ed Requirement) --	3	
ENGL 120, College Composition II . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Humanities & Fine Arts Gen Ed Requirement . . . . .	3	3
Science & Technology Gen Ed Requirement . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	15	15

**Second Year**

COMM 200, Intro to Media Writing . . . . .	3	--
COMM 212, Interpersonal Communication		
(Social & Behav Science College Requirement) --	3	
COMM 216, Intercultural Communication . . . . .	3	--
COMM 301, Rhetorical Traditions <b>or</b>		
COMM 321, Intro to Communication Theory .3	--	
COMM 310, Advanced Media Writing . . . . .	--	3
CSCI 114, Microcomputer Packages (3 cr.) <b>or</b>		
CSCI 116, Business Use of Computers (4 cr.)		
(Science & Technology Gen Ed Requirement) . . . . .	--	3 or 4
Humanities AHSS College Requirement . . . . .	--	3
Fine Arts AHSS College Requirement . . . . .	3	--
Science & Tech Gen Ed Requirement & Lab . . . . .	4	--
Additional Course (Humanities, Soc Science or		
Fine Arts outside of major) . . . . .	--	3
Totals . . . . .	16	15 or 16

**Third Year**

COMM 313, Editorial Processes . . . . .	3	--
COMM 320, Communication Analysis . . . . .	3	--
COMM 375, Principles of Advertising . . . . .	3	--
COMM 376, Advertising Creative Strategies . . . . .	--	3
COMM 377, Advertising Media Planning . . . . .	--	3
Minor Courses . . . . .	3	3
Junior-level English Composition Course . . . . .	--	3
Electives . . . . .	3	3
Totals . . . . .	15	15

**Fourth Year**

COMM 434, Communication Law . . . . .	3	--
COMM 476, Advertising Campaigns Practicum . . . . .	3	--
COMM 489, Capstone in Communication . . . . .	--	3
COMM 496, Field Experience . . . . .	3	--
Minor Courses . . . . .	6	6
Electives . . . . .	--	7
Totals . . . . .	15	16

**Recommended '06-07 Curriculum Public Relations Track**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
CJ 201 <b>or</b> POLS 110 <b>or</b> PSYC 111 <b>or</b>		
SOC 110, Intro to Criminal Justice <b>or</b>		
Intro to Political Science <b>or</b>		
Intro to Psychology <b>or</b>		
Intro to Sociology . . . . .	3	--
COMM 110, Fund of Public Speaking <b>or</b>		
COMM 111, Honors Public Speaking . . . . .	3	--
COMM 112, Understanding Media/Social Change		
(Social & Behav Science Gen Ed Requirement) --	3	
COMM 114, Human Communication		
(Social & Behav Science Gen Ed Requirement) .3	--	
CSCI 122, Beginning BASIC/Visual Basic		
(Quantitative Reasoning Gen Ed Requirement) --	3	
ENGL 120, College Composition II . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Humanities & Fine Arts Gen Ed Requirement . . . . .	3	3
Science & Technology Gen Ed Requirement . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	15	15

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Second Year</b>		
COMM 200, Intro to Media Writing . . . . .	3	--
COMM 212, Interpersonal Communication (Soc & Behav Science College Requirement) . . . . .	3	--
COMM 216, Intercultural Communication . . . . .	3	--
COMM 301, Rhetorical Traditions <b>or</b>		
COMM 321, Intro to Communication Theory . . . . .	3	--
COMM 310, Advanced Media Writing . . . . .	3	--
CSCI 114, Microcomputer Packages (3 cr.) <b>or</b>		
CSCI 116, Business Use of Computers (4 cr.) (Science & Technology Gen Ed Requirement) . . . . .	3 or 4	--
Humanities AHSS College Requirement . . . . .	3	--
Fine Arts AHSS College Requirement . . . . .	3	--
Science & Tech Gen Ed Requirement & Lab . . . . .	4	--
Additional Course (Humanities, Soc Science or Fine Arts outside of major) . . . . .	--	3
Totals . . . . .	16	15 or 16

<b>Third Year</b>		
COMM 313, Editorial Processes . . . . .	3	--
COMM 320, Communication Analysis . . . . .	3	--
COMM 370, Principles of Public Relations . . . . .	3	--
COMM 434, Communication Law . . . . .	3	--
COMM 443, Mass Media & Public Opinion . . . . .	3	--
COMM 472, Public Relations Campaigns . . . . .	3	--
COMM 485, Crisis Comm in Public Relations . . . . .	3	--
Minor Courses . . . . .	3	3
Junior-level English Composition Course . . . . .	--	3
Totals . . . . .	15	15

<b>Fourth Year</b>		
COMM 489, Capstone in Communication . . . . .	3	--
COMM 496, Field Experience . . . . .	3	--
Minor Courses . . . . .	6	6
Upper Division Units in Communication . . . . .	.6	--
Electives . . . . .	--	7
Totals . . . . .	15	16

**Minor in Public Relations and Advertising (21 credits)**

Students who are looking to minor in Public Relations and Advertising are required to take COMM 112, 114, 212, 200, 301 or 321, 320, 370, 375, 434 and 472.

**Experiential On-Campus Opportunities**

The department oversees several on-campus communication-related opportunities for students: KDSU 91.9 FM is an affiliate of North Dakota Public Radio with internships available for qualified students; Thunder Radio is NDSU's student-run radio station; and the Spectrum is a student-run newspaper published twice weekly throughout the academic year where students may receive credit or salary. In addition, departmental academic organizations include Public Relations Student Society of America, Lambda Pi Eta, and Pi Kappa Delta.

For more information, contact the Department of Communication.

**Department of Criminal Justice and Political Science**  
[www.ndsu.edu/ndsu/cjps](http://www.ndsu.edu/ndsu/cjps)

**Criminal Justice Major**

The criminal justice practitioner deals with the broad areas of law enforcement, courts, corrections, and social services. Professional positions may include federal law enforcement, municipal law enforcement, juvenile probation, counseling and correctional work in institutions, victim advocacy programs, group homes and halfway houses. Within these broad areas the practitioner enjoys exciting professional challenges and opportunities for serving society and helping people.

Types of agencies that have employed our graduates include: the FBI, Drug Enforcement Administration, local police departments, sheriff's departments, Border Patrol, juvenile courts, Bureau of Criminal Investigation, U.S. Secret Service, probation and parole departments, juvenile and adult correctional institutions, halfway houses, and crime and delinquency prevention programs.

A total of 52 credits (depending on coursework) is required for a major in criminal justice. A basic background in the social sciences, behavioral sciences, and civics is helpful. Students may transfer into the program as late as their third year and remain on schedule for graduation if they have taken adequate general education courses.

**Recommended '06-07 Curriculum Criminal Justice Major**

The Criminal Justice curriculum is an interdisciplinary program drawing on the social sciences, behavioral sciences, humanities, computer sciences, and accounting.

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
CJ 201, Intro to Criminal Justice . . . . .	3	--
CJ 230, Criminology & Criminal Law . . . . .	3	--
ANTH 111, Intro to Anthropology . . . . .	--	3
ENGL 110, 120, College Composition I, II . . . . .	3	3
COMM 110, Fund of Public Speaking . . . . .	3	--
UNIV 189, Skills for Academic Success . . . . .	.1	--
CJ 299, Intro to Policing . . . . .	3	--
Humanities & Fine Arts Gen Eds . . . . .	3	3
PSYC 111, Intro to Psychology . . . . .	--	3
Totals . . . . .	13	18

<b>Second Year</b>		
ACCT 102, Fundamentals of Accounting . . . . .	3	--
POLC 230, Judicial Process . . . . .	3	--
PSYC 211, Behavior Modification . . . . .	3	--
PSYC 270, Abnormal Psychology . . . . .	3	--
Humanities AHSS College Requirement . . . . .	3	--
Fine Arts AHSS College Requirement . . . . .	3	--
Science & Tech Gen Ed Requirement & Lab . . . . .	3	4
Minor Elective or Foreign Language . . . . .	3	--
AHSS Additional Course (Humanities or Fine Arts) . . . . .	--	3
Totals . . . . .	15	16

<b>Third Year</b>		
Wellness Gen Ed Requirement . . . . .	2	--
PSYC 212, Psyc Aspects of Drug Use/Abuse <b>or</b>		
PSYC 380, Clinical Psychology . . . . .	3	--
CJ 325, Applied Research Methods . . . . .	4	--
CJ 330, Criminal Law & Procedure . . . . .	2	--
STAT 330, Introductory Statistics . . . . .	3	--
Minor Elective or Foreign Language . . . . .	3	6
PSYC 370, Forensic Psychology . . . . .	3	--
Science & Tech Gen Ed Requirement . . . . .	--	3
Totals . . . . .	16	13

<b>Fourth Year</b>		
CJ 407, Deviant Behavior . . . . .	3	--
CJ 406, Crime & Delinquency . . . . .	3	--
CJ 460, Criminalization . . . . .	3	--
CJ 461, Corrections . . . . .	3	--
CJ 489, CJ Capstone Course . . . . .	1	--
CJ 496, Field Experience . . . . .	1-6	--
Minor Electives or Foreign Language . . . . .	.6	1-6
Electives . . . . .	--	3
Totals . . . . .	15	16
<b>Curriculum Total . . . . .</b>	<b>122</b>	

**Criminal Justice Minor**

The minor in criminal justice provides an opportunity for students in fields outside of the criminal justice program to gain valuable knowledge regarding criminological theory and the history, operation

and effectiveness of various parts of the criminal and juvenile justice system.

Students are required to take 17 - 19 credits, depending on the courses they choose. Required courses include: Introduction to Criminal Justice (CJ 201), Criminology and Criminal Law (CJ 230), Criminalization (CJ 460), and Corrections (CJ 461). In addition, any two of the following courses will be required as electives: Criminal Law and Procedure (CJ 330), (or Constitutional Law: Criminal Justice (POLS 431), Crime & Delinquency (CJ 406), or Deviant Behavior (CJ 407). Student must complete at least one course in research methods in a social science, either in the student's major area of study, or if the student's major program does not require a similar course, by taking Applied Research Methods (CJ/POLS/COMM 325).

**Fraud Investigation Minor**

Students in this interdisciplinary minor will study the causes of fraud, as well as the detection, investigation, and prevention of fraud. See Interdisciplinary Programs section for further information.

**Criminal Justice Club and Internships**

Students may expand their knowledge of criminal justice and career opportunities through the meetings with professionals and field trips sponsored by this club.

The department also offers internships and cooperative education opportunities. For specifics, contact the department.

**Political Science Major**

Political science is the study of politics, government, and public policy. This includes the investigation of political institutions, international relations, law, and political values. The purpose of classes in political science is to provide students with knowledge to assist them in understanding how government and politics affect their everyday lives. Political science offers the student career opportunities in public service, business, and education. Also, many students interested in attending law school select political science as a major. As part of its offerings the department offers a special program of pre-law advisement.

A total of 40 credits are required for a major in Political Science. All students are required to complete Introduction to Political Science (110) or American Government (115), Applied Research Methods (325), Political Ideologies (240), International Politics (220) or Comparative Politics (225), and Senior Seminar (489). In addition, four 400-level classes must be taken; one from each of these areas: law, American Government, comparative politics, and international relations. Nine credits of electives are also to be selected in consultation with an advisor.

**Recommended '06-07 Curriculum Political Science Major**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
COMM 110, Fund of Public Speaking . . . . .	--	3
ENGL 110, 120, College Composition I, II . . . . .	3	3
UNIV 189, Skills for Academic Success . . . . .	.1	--
Political Science 110 <b>or</b> 115 . . . . .	3	--
Science & Tech . . . . .	--	3
Humanities/Fine Arts . . . . .	3	3
Political Science 220 <b>or</b> 225 . . . . .	--	3
Soc/Behavioral Sciences . . . . .	3	--
Wellness . . . . .	.3	--
Totals . . . . .	16	15

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Second Year</b>		
Humanities/Fine Arts . . . . .	3	3
Political Science Electives . . . . .	3	6
Science & Lab . . . . .	--	4
Soc/Behavioral Sciences . . . . .	3	--
Coursework in Minor Area . . . . .	3	--
Free Electives . . . . .	3	--
Political Science . . . . .	--	3
Totals . . . . .	15	16

<b>Third Year</b>		
Humanities/Fine Arts . . . . .	--	3
Political Science Upper-Division . . . . .	3	3
Science/Technology . . . . .	3	--
Social Sciences/Free Electives . . . . .	3	--
Coursework in Minor Area . . . . .	6	6
Introductory Statistics . . . . .	--	3
Totals . . . . .	15	15

<b>Fourth Year</b>		
Applied Research Methods . . . . .	4	--
Political Science Upper-Division . . . . .	3	3
Senior Seminar . . . . .		3
Coursework in Minor Area . . . . .	3	--
Free Electives . . . . .	6	9
Totals . . . . .	16	15

**Curriculum Total . . . . . 123**

**Political Science Minor**

The minor in Political Science requires a minimum of 21 credits including Introduction to Political Science (110) or American Government (115) and International Politics (220) or Comparative Politics (225). Three classes of the student's choice at the 400-level in law, behavior, international relations, or comparative politics are required. Six credits of electives also are to be selected in consultation with an advisor.

**Pre-Law Emphasis**

The department offers a special Pre-Law emphasis for those individuals who wish to pursue careers in law. It consists of a major in Political Science (40 hours) that includes a concentration of law related courses, as well as required classes in English and Communication. Electives in business, communication, criminal justice and accounting are also part of the emphasis. For further information and specific course requirements contact any political science faculty.

**Public Service Option**

The Public Service option allows students to concentrate their coursework in two distinct areas of study: government administration and political management. The government administration area is designed for students seeking careers in the administration of public, private/public, or non-profit organizations. The political management area is designed for students seeking careers in connection to political parties, campaign consultants, interest groups, and the political media. Each area requires a 15 credit internship. For further information on the specific requirements, please contact the department.

**Department of English**

[www.ndsu.edu/ndsu/english](http://www.ndsu.edu/ndsu/english)

The English Department intends that its students will form strong communication skills, establish research methods, develop flexibility in facing complex situations, and increase their awareness of the humanities tradition. These ideals suit both the liberal arts major and the practical, pre-professional student. Success in the marketplace is tied to the ability to analyze, understand, and restate written material. Such success requires habits of investigation, a fluency with documents and speeches, and the self-assurance

to handle unfamiliar materials. Thus, in its offerings, the department serves the traditions of language and literature, while it responds to the needs of today's students.

The department further reflects such responses in its participation in the Humanities major, the Scholars Program, and the Women's Studies minor. Moreover, the department supports the Cooperative Education Program and welcomes efforts to create student internships.

The English Department offers a Bachelor of Arts degree in English, a Bachelor of Science degree in English, a Bachelor of Arts degree in English Education and a Bachelor of Science degree in English education.

The B.A. and B.S. degrees in English require 42 credits in English courses beyond the first-year English composition sequence. The B.A. degree requires two years of a foreign language or the equivalent competency; whereas, the B.S. requires a minor outside English.

The B.A. and B.S. degrees in English Education require 36 credits in English courses beyond the first-year English composition sequence and 34 credits in Education courses. The B.A. requires an additional six credits in Arts, Humanities and Social Science (AHSS) courses and two years of a foreign language or the equivalent competency. A B.S. degree in English Education with an option in communication is available that leads to certification in both English and Speech. English teaching majors should contact the School of Education or the English Education advisor for additional requirements.

Transfer credits with grades of D are not accepted for English major requirements.

**English Major (B.A. or B.S.)**

ENGL 167, 271, 275, 358, 467, six credits in literature survey courses, six credits in cultural diversity courses in English, and 15 upper-division elective credits, nine of which must be at the 400 course level.

**Recommended Curriculum English Major, (B.A. or B.S.)**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
COMM 110, Fund of Public Speaking . . . . .	--	3
ENGL 120, College Composition II . . . . .	--	3
ENGL 167, Intro to English Studies . . . . .	3	--
MATH 104 or higher <b>or</b> CSCI 122 . . . . .	3	--
UNIV 189, Skills for Academic Success . . . . .	1	--
Foreign Language or Minor . . . . .	4/3	4/3
Social/Behavioral Science . . . . .	3	3
Elective . . . . .	--	3
Totals . . . . .	14	13/16/15

<b>Second Year</b>		
Literature Survey . . . . .	3	3
ENGL 271, Literary Analysis . . . . .	3	--
Foreign Language <b>or</b> Minor . . . . .	3	3
Social/Behav Sci & Fine Arts Elective . . . . .	3	--
English Cultural Diversity Course . . . . .	3	--
Humanities & Fine Arts Elective . . . . .	--	3
Science & Tech. . . . .	--	3
ENGL 275, Intro to Writing Studies . . . . .	--	3
Totals . . . . .	15	15

<b>Third Year</b>		
English Cultural Diversity Course . . . . .	--	3
ENGL 358, Writing in Hum & Soc Sciences . . . . .	3	--
ENGL 380, Shakespeare . . . . .	--	3
Science & Tech (Lab) . . . . .	4	3
Social/Behav Sci <b>or</b> Fine Arts Elective . . . . .	--	3
Wellness . . . . .	--	2
Cultural Diversity . . . . .	3	--
Global Perspectives . . . . .	3	--
Electives (e.g., minor) . . . . .	2	3
Totals . . . . .	15	17

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Fourth Year</b>		
ENGL 467, Capstone . . . . .	3	--
300-400-Level English Elective . . . . .	--	12
Electives (e.g., career-oriented, minor) . . . . .	12	3
Totals . . . . .	15	15

**Curriculum Total . . . . . 122**

**English Education Major (B.A. or B.S.)**

ENGL 209, 222, 240, 251 or 252, 261 or 262, 271, 358, 360, 380, 458, six elective credits in English literature; EDUC 321, 322, 381, 389, 451, 481, 482, 485, 486, and twelve credits of 487 (student teaching). The BA requires an extra six credits in AHSS courses plus two years of a foreign language or the equivalent competency.

**English Minors**

Minor sequences are available for liberal arts and writing. The two minors require a minimum of 21 credits in English beyond the freshman English sequence.

**Minor in English: Liberal Arts**

ENGL 251 and 252 or 261 and 262, 271, 358, and nine elective credits.

**Minor in English: Writing**

ENGL 275 and five from among the following (320, 321, 322, 323, 357, 358, 457, 458 and 459), and one upper-division linguistics or literature class. One of these must be at the 400 level.

**Division of Fine Arts**

[www.ndsu.edu/finearts](http://www.ndsu.edu/finearts)

The Division of Fine Arts includes the Departments of Music, Theatre Arts and Visual Arts as well as their exhibition and performance spaces. We are dedicated to excellence as we educate our students, create, and interpret works of art, and disseminate that excellence throughout the greater university community and the region.

**Department of Visual Arts**

Art students develop creative technique as well as a life-long commitment to visual understanding and expression. Careers that may result from an art degree include commercial art/graphic design, animation, illustration, arts marketing, commercial photography, museum/gallery work, exhibition design, independent studio art, municipal art programs, art criticism, independent art instruction, art media research, arts organizations management, arts-funding agency work, or continued study in graduate school. A comprehensive curriculum in visual arts is offered through a highly supportive studio program augmented by academic art courses. Emphasis is placed upon developing individual concept and content within a broad context of knowledge and skills. The faculty is composed of active studio artists and an art historian, all with extensive experience in both professional and academic settings. Well-equipped facilities are maintained for drawing, painting, printmaking, photography, sculpture and ceramics. Academic facilities both in the main library and in the James Falck Departmental Library house slides and publications.

All art majors develop a strong foundation in design and drawing. Then, through experiences in diverse art media, they develop an area of concentration. Motivated and successful upper-class students are eligible to compete for scholarships and individual studio space. All art students are encouraged to supplement their education with outside art experiences such as summer internships and to participate in national and international art competitions and exhibitions.

## Art Major

The Department of Art offers three undergraduate degrees: The Bachelor of Fine Arts, the Bachelor of Arts, and the Bachelor of Science. The B.F.A. is a professional degree featuring a studio art concentration, while the B.A. and B.S. are liberal arts degrees. The B.A. requires an intermediate competency in a foreign language while the B.S. requires an approved minor outside art. Both the B.A. and B.S. require studio components.

## Recommended '06-07 Curriculum Bachelor of Fine Arts Degree

	Credits	
	F	S
<b>First Year</b>		
ART 122, 124, 2-D, 3-D Design . . . . .	3	3
ART 210, 211, Art History I, II . . . . .	3	3
ART 130, 230, Drawing I, II . . . . .	3	3
ENGL 110, 120, College Composition I, II . . . . .	3	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Science & Technology/with Lab . . . . .	3	3/1
Totals . . . . .	16	16

### Second Year

ART 330, 335, Drawing III, Fig Draw . . . . .	3	3
ART 180, Photography . . . . .	3	--
ART 160, Sculpture I . . . . .	--	3
ART 170, Printmaking I . . . . .	3	--
ART 150, Ceramics I . . . . .	--	3
ART 185, Digital Media . . . . .	3	--
COMM 110, Fund of Public Speaking . . . . .	3	--
Quantitative Reasoning . . . . .	--	3
Humanities . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	17	15

### Third Year

ART 120, Painting I . . . . .	--	3
ART 451, 452, Am Art, Contemporary Art . . . . .	3	3
ART 491, Seminar in Art . . . . .	1	--
Upper Division Studio Elective . . . . .	3	6
Humanities or Social/Behav Science . . . . .	3	--
Social/Behavioral Sciences . . . . .	--	3
Global Perspective & Cultural Diversity . . . . .	6	--
Totals . . . . .	16	15

### Fourth Year

ART 489 Baccalaureate Project . . . . .	3	3
Art History Elective . . . . .	3	--
Studio Emphasis . . . . .	6	6
Social/Behavioral Science . . . . .	--	6
Science & Technology . . . . .	3	--
Totals . . . . .	15	15

**Curriculum Total . . . . . 125**

## Recommended '06-07 Curriculum Bachelor of Arts/Bachelor of Science Degrees

	Credits	
	F	S
<b>First Year</b>		
ART 122, 124, 2-D, 3-D Design . . . . .	3	3
ART 210, 211, Art History I, II . . . . .	3	3
ART 180/185, Photo or Digital Media . . . . .	3	--
ENGL 110, 120, College Composition I, II . . . . .	3	3
Quantitative Reasoning . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Science & Tech/Lab . . . . .	--	3/1
Wellness . . . . .	2	--
Totals . . . . .	15	16

### Second Year

ART 130, 230, Drawing I, II . . . . .	3	3
ART 150/160, Ceramics I <b>or</b> Sculpture I . . . . .	3	--
ART 120/170, Painting I <b>or</b> Printmkg I . . . . .	--	3
COMM 110, Fund of Public Speaking . . . . .	3	--
Minor or Foreign Language . . . . .	3-4	3-4
Social/Behavioral Elective . . . . .	3	3
Science/Technology Electives . . . . .	--	3
Totals . . . . .	15-16	15-16

	Credits	
	F	S
<b>Third Year</b>		
ART 335/330, Figure Drawing <b>or</b> Drawing III . . . . .	3	--
ART 452, Contemporary Art . . . . .	3	--
Upper Division Studio Elective . . . . .	--	3
Foreign Language or Minor . . . . .	3	3
Social/Behavioral Science . . . . .	--	3
Humanities Elective . . . . .	3	3
Global Perspective & Cultural Diversity . . . . .	3	3
Totals . . . . .	15	15

### Fourth Year

ART 489 Baccalaureate Project . . . . .	--	3
Free Electives . . . . .	16	12
Totals . . . . .	16	15

**Curriculum Total . . . . . 122-124**

## Art Minor

The study of art improves comprehension and interpretation of all visual input. The visual arts minor consists of a minimum of 18 credits, including:

- ART 130, Drawing I
- ART 122, Two Dimensional Design
- ART 124, Three Dimensional Design

### Plus

Any art history or art appreciation course (3 hours)  
Two additional art electives in either studio or art history courses (6 hours)

## Department of Music

The Department of Music prepares students for careers in teaching, performance and/or liberal studies. It also provides creative opportunities for all talented student musicians regardless of major, and seeks to foster an appreciation of music throughout the greater NDSU community.

NDSU music is accredited by the National Association of Schools of Music. Programs of study lead to the Bachelor of Music in Performance, the Bachelor of Science in Education, the Bachelor of Arts in Music, the Bachelor of Science in Music, the Master of Music in Performance or Conducting, the Master of Education in Music, and the Doctor of Musical Arts in Performance or Conducting.

## Majors/Minors

Admission to music major or minor programs is arranged through an audition and interview; for information, please contact the Division of Fine Arts office. All undergraduate music majors take private lessons, participate in ensembles, and take a broad range of courses appropriate to their areas of emphasis.

The Bachelor of Music degree is for talented vocalists and instrumentalists who wish a career as a professional performer or conductor, and who will likely continue their studies in graduate school.

The Bachelor of Science in Education certifies graduates to teach music in North Dakota's public schools. Certification for other states varies, but North Dakota licensure is congruent with that of many other states. Instrumental majors also complete a voice/choral minor; voice/choral majors also complete an instrumental minor. This experience results in NDSU's outstanding reputation for producing teachers with excellent and versatile credentials.

Music majors pursuing a Bachelor of Arts or Bachelor of Science degree (without public school teaching certification) are generally interested in a broad liberal arts education with a significant number of electives.

Music majors and minors supplement their course work by attending recitals and concerts. Those in applied study perform for the jury examination at the end of each semester. Students enrolled in private applied study also participate in a related major

ensemble, except for pianists, who often play with chamber ensembles.

## Ensembles

The Department of Music sponsors a variety of ensembles including the Gold Star Concert Band, Concert Choir, Wind Ensemble, Madrigal Singers, two Jazz Ensembles, Jazz Combos, Gold Star Marching Band, Brass Ensemble, University Chorus, Men's Ensemble, Women's Chorus, Varsity Band, Bison Pep Band, Opera Workshop, and chamber ensembles in typical instrumental and vocal combinations. The Concert Choir, Gold Star Concert Band, Jazz Ensemble, Madrigal Singers and several other groups have touring programs, some of which are national or international in scope. Participation in these ensembles is open to all students, some by audition and some as recreational ensembles.

## Music Curricula

Requirements are grouped by degree. Please refer also to graduation requirements listed in the Academic Policies section of this publication. The information in this bulletin may be superseded by information in a Music Student Handbook; check with the Division of Fine Arts office for details.

## The Bachelor of Music (B.Mus.)

The professional undergraduate degree in music, the B.Mus. is designed for students pursuing a career as a performing musician. Such students often continue advanced study in graduate school. All students will audition for the appropriate performance faculty members and demonstrate professional-level skills or potential. In addition to college and university requirements, all students will take courses in the core requirements section, and then select a specialized curriculum under instrumental, voice or piano.

Core Requirements	Credits
MUSC 103, Introduction to Music History . . . . .	3
MUSC 130, 131, Elem Harmony I, II . . . . .	6
MUSC 132, 133, Elem Ear Training I, II . . . . .	2
MUSC 230, 231, Adv Harmony I, II . . . . .	6
MUSC 232, 233, Adv Ear Training I, II . . . . .	2
MUSC 250, Basic Conducting . . . . .	2
MUSC 330, Contemporary Harmonic Techniques . . . . .	2
MUSC 340, 341 Music History I, II . . . . .	6
MUSC 411, Form & Analysis . . . . .	2
Applied Study (various registration numbers) <sup>1</sup> . . . . .	22
Pedagogy (through applied study registration) . . . . .	2
MUSC 380, 480, Recitals . . . . .	1,1

<sup>1</sup> Applied study refers to private lessons on a musical instrument or in voice. Course numbers indicate instrument category and year-of-study level.

## Instrumental Track

MUSC, 141, Symphonic Literature . . . . .	2
MUSC 331, Instrumental Arranging . . . . .	2
MUSC 344, Wind Band Literature . . . . .	2
Applied Piano (class or individual study) . . . . .	4
Jazz studies (from MUSC 311, 364, 358) . . . . .	4
Major Ensembles (from MUSC 111, 303, 311) . . . . .	8
Minor Ensembles (from MUSC 310-316) . . . . .	4

## Vocal Track

MUSC 150, 350, Vocal Pedagogy I, II . . . . .	4
MUSC 174, 175, Pronunc for Singers I, II . . . . .	2
MUSC 142, Opera Literature . . . . .	2
MUSC 199, Song Literature . . . . .	2
Applied Piano (class or individual study) . . . . .	4
Major Ensembles (selected from MUSC 115, 306) . . . . .	8
Minor Ensembles (selected from MUSC 317-319) . . . . .	2
FREN 101, 102, First-year French I, II . . . . .	8
GERM 101, 102, First-year German I, II . . . . .	8

Language requirement may be satisfied by departmental proficiency evaluation.



<b>Piano Track</b>	<b>Credits</b>
Additional Pedagogy (through applied study reg) . . . . .	2
MUSC 143, Keyboard Literature . . . . .	2
Additional Literature (from MUSC 141, 142, 199, 344) . . . . .	2
Jazz studies (from MUSC 311, 364, 358) . . . . .	4
Major Ensembles (from MUSC 111, 303, 311) . . . . .	4
Minor Ensembles (from MUSC 310-316) . . . . .	4

## B.S. with a Major in Music Education

All students must complete the School of Education requirements, complete the common music requirements, complete either the vocal or instrumental emphasis and pass a piano proficiency examination prior to student teaching. Specific general education requirements, admission to the School of Education and other information may be obtained from the Division of Fine Arts office.

<b>Common Music Requirements</b>	<b>Credits</b>
MUSC 103, Intro to Music History . . . . .	3
MUSC 130, 131, Elem Harmony I, II . . . . .	6
MUSC 132, 133, Elem Ear Training I, II . . . . .	2
MUSC 150, Vocal Methods & Ped I . . . . .	2
MUSC 230, 231, Adv Harmony I, II . . . . .	6
MUSC 232, 233, Adv Ear Training I, II . . . . .	2
MUSC 250, Basic Conducting . . . . .	2
MUSC 341, Music History II . . . . .	3
MUSC 351, Instrumental Conducting & Literature . . . . .	2
MUSC 352, Choral Conducting & Literature . . . . .	2
MUSC 353, Woodwind Methods I . . . . .	2
MUSC 355, Brass Methods . . . . .	2
MUSC 359, Percussion Methods . . . . .	2
MUSC 480, Recital . . . . .	1
Applied or Class Piano . . . . .	2
Minor Ensemble . . . . .	2
Total . . . . .	41

## Vocal Emphasis

MUSC 174, 175, Pronunciation for Singers I, II . . . . .	2
MUSC 332, Choral Arranging . . . . .	2
MUSC 350, Vocal Methods & Pedagogy II . . . . .	2
MUSC 358, Jazz Methods . . . . .	2
Applied Voice . . . . .	7
Major Choral Ensemble . . . . .	7
Major Instrumental Ensemble . . . . .	2
Additional Study in Piano . . . . .	2
Total . . . . .	26

## Instrumental Emphasis

MUSC 331, Instrumental Arranging . . . . .	2
MUSC 344, Wind Band Literature . . . . .	2
MUSC 354, Woodwind Methods II . . . . .	2
MUSC 357, Marching Band Meth/Tech <b>or</b> MUSC 358, Jazz Methods . . . . .	2
Applied Major Instrument . . . . .	7
Major Instrumental Ensemble <sup>1</sup> . . . . .	7
Major Choral Ensemble . . . . .	2
Applied Voice/Voice Class . . . . .	2
Total . . . . .	26

For students whose primary instrument is keyboard, Keyboard Literature is required instead of two credits of a methods class.

## Education Requirements

EDUC 321, Intro to Teaching . . . . .	3
EDUC 322, Educational Psychology . . . . .	3
EDUC 381, Early Experience . . . . .	1
EDUC 389, Native Am/Instr Pract . . . . .	3
EDUC 451, Instr Planning & Strategies . . . . .	3
EDUC 481, 482, Clrm Prac/Meth I,II . . . . .	4
EDUC 485, Student Teaching Seminar . . . . .	1
EDUC 486, Classroom Mgt . . . . .	3
EDUC 487, Student Teaching . . . . .	10
Total . . . . .	31

<b>*K-12 Option</b>	<b>Credits</b>
CDFS 230 Life Span Dev <b>or</b> PSYC 250, Dev Psyc (Psyc 111 Prereq.) . . . . .	3
EDUC 300, Orient/Elem Teaching . . . . .	2
EDUC 483, Clrm Prac/Meth III . . . . .	2
Total . . . . .	5

## Summary of Music Education Major Requirements

Additional General Education Courses <sup>2</sup> . . . . .	31
Music (vocal or instrumental) . . . . .	70
Education . . . . .	31
K-12 Option . . . . .	7
<b>Curriculum Total . . . . .</b>	<b>132-139</b>

<sup>1</sup> For the instrumental emphasis, students whose primary instrument is keyboard, four credits of Piano Chamber Music may be substituted for four of the seven Major Instrumental Ensemble credits.

<sup>2</sup> General Education requirements total 37 hours, but MUSC 103 and MUSC 340 listed earlier fulfill six credits of the general education humanities category.

## B.A. or B.S. with a Major in Music

Majors interested in a general liberal arts degree should pursue the Bachelor of Arts (which requires a level-4 language proficiency) or the Bachelor of Science (which requires an outside approved minor).

## Core Requirements for all

<b>B.A. and B.S. Programs</b>	<b>Credits</b>
MUSC 103, Intro to Music History . . . . .	3
MUSC 130, 131, Elem Harmony I, II . . . . .	3,3
MUSC 132, 133, Elem Ear Training I, II . . . . .	1,1
MUSC 230, 231, Adv Harmony I, II . . . . .	3,3
MUSC 232, 233, Adv Ear Training I . . . . .	1,1
MUSC 340, 341, Music History I, II . . . . .	6
Applied Music . . . . .	6
Major Ensembles . . . . .	6
Music Electives or Emphasis Courses . . . . .	18
Total . . . . .	55

## Summary of B.A. or B.S. Music Major Requirements

Music Core Requirements . . . . .	55
Foreign Language (B.A.) <b>or</b> Approved Minor (B.S.) . . . . .	14-16 (min.)
Additional General Education (including AHSS College Requirements and Other Electives) . . . . .	53
<b>Curriculum Total . . . . .</b>	<b>122-124 (min.)</b>

**Note:** 37 credits must be at the 300-400 level.

## Music Minors

Two minors are offered — one for the general student, one specifically designed for the education major.

## General Music Minor

	<b>Credits</b>
MUSC 103, Intro to Music History . . . . .	3
MUSC 130, 131, Elem Harmony I, II . . . . .	3,3
MUSC 132, 133, Elem Ear Train I, II . . . . .	1,1
Applied Study (2 semesters) . . . . .	1,1
Major Ensemble (2 semesters) . . . . .	1,1
Music Electives . . . . .	6
Total . . . . .	21

## Music Minor for Education Majors

MUSC 103, Intro Music History . . . . .	3
MUSC 130, 131, Elem Harmony I, II . . . . .	3,3
MUSC 132, 133, Elem Ear Training I, II . . . . .	1,1
MUSC 150, Basic Conducting . . . . .	2
Applied Study (2 semesters) . . . . .	1,1
Major Ensemble (2 semesters) <b>and</b> . . . . .	1,1
<b>Two credits from the following:</b> . . . . .	<b>2</b>
EDUC 481, Clrm Prac/Meth of Teach (Instr) EDUC 482, Clrm Prac/Meth of Teach (Vocal) EDUC 483, Clrm Prac/Meth of Teach (Elem) <b>and</b>	

<b>Two credits from the following:</b> . . . . .	<b>2</b>
MUSC 150, Vocal Methods & Pedagogy I MUSC 353, Woodwind Methods I MUSC 355, Brass Methods I MUSC 359, Percussion Methods	
Total . . . . .	21

## Department of Theatre Arts

Programs of study in theatre arts lead to the Bachelor of Science, Bachelor of Arts, and Bachelor of Fine Arts degrees. The requirements for all degree tracks are flexible enough to be designed to fit the individual student's career goals. Specialization is possible in the areas of acting, design, directing, and technical theatre.

In addition to academic course work, every undergraduate theatre major is required to participate in some way in at least one theatrical production per semester. Little Country Theatre (LCT), the producing arm of Theatre Arts, has been an important part of campus life at NDSU since 1914 and is the oldest theatre in the state. LCT productions include three to four plays each year — plays that challenge and enrich the mind, talent, and imagination. Productions are chosen in such a way that students will have an opportunity to be exposed to the full heritage of Western drama during their years at the university. Participation in LCT productions is open to all NDSU students, regardless of major.

The Bachelor of Arts (B.A.) and the Bachelor of Science (B.S.) with a major in theatre arts are general baccalaureate degrees providing a liberal arts background with major emphasis in theatre. Two years of a foreign language are required for the B.A. degree, while an approved minor area is required for the B.S. degree.

The Bachelor of Fine Arts (B.F.A.) with a major in theatre arts is a professionally oriented program and can be entered only by faculty approval, usually at the end of the sophomore year. This degree program provides in-depth study of a theatre specialization and related fine arts fields. Students graduating with the B.F.A. must complete, during the senior year, a capstone project demonstrating mastery of advanced skills and creative expressiveness.

A minor in theatre arts is available with a general studies emphasis or with an emphasis either in general theatrical design and technical theatre, scenic design and technology, costume design and technology, or in performance (acting and directing).

A student who wishes to teach theatre in high school should select a teaching major approved by the School of Education and supplement that major with a major or minor in theatre arts.

Courses for theatre arts majors and minors are grouped into tracks and emphasis areas. In addition to college and university requirements, (see graduation requirements listed in the Academic Policies section), the following courses are required.

## Bachelor of Arts or Bachelor of Science with a Major in Theatre Arts

<b>Major Requirements</b>	<b>Credits</b>
ART 210, 211, Art History I, II . . . . .	6
MUSC 104, 105, Intro to Music Lit I, II . . . . .	6
THEA 161, Acting I . . . . .	3
THEA 180, Dramatic Lit & Style . . . . .	3
THEA 200, Intro/Theatre Practicum . . . . .	1
THEA 201, Theatre Practicum . . . . .	7
THEA 261, Acting II . . . . .	3
THEA 270, Stagecraft . . . . .	3
THEA 275, Makeup Design I . . . . .	3

	<i>Credits</i>
THEA 280, World Theatre . . . . .	3
THEA 365, Directing I . . . . .	3
THEA 375, Intro to Stage Design . . . . .	3
THEA 450, Capstone Experience . . . . .	3
THEA 480, 481, Hist & Lit of Theatre I, II . . . . .	6
Total . . . . .	53

**Plus 21 credits from the following:**

THEA 115, World Film . . . . .	3
THEA 266, Voice & Movement for the Actor . . . . .	3
THEA 271, Costume Construction . . . . .	3
THEA 276, Makeup Design II . . . . .	3
THEA 372, Stage Management . . . . .	3
THEA 465, Directing II . . . . .	3
THEA 468, Business of Acting . . . . .	3
THEA 476, Design for the Stage II . . . . .	3
Total . . . . .	21

**And 3 credits from the following:**

ENGL 344, American Drama . . . . .	3
ENGL 380, Shakespeare . . . . .	3
ENGL 462, Modern European Drama . . . . .	3
ENGL 484, Restor & 18th Century Drama . . . . .	3
Total . . . . .	3

**B.F.A. with a Major in Theatre Arts: Performance Track**

<i>Major Requirements</i>	<i>Credits</i>
ART 210, 211, Art History . . . . .	6
MUSC 104, 105, Intro to Music Lit I, II . . . . .	6
ENGL 380, Shakespeare . . . . .	3
THEA 161, 261, Acting I, II . . . . .	6
THEA 180, Dramatic Lit & Style . . . . .	3
THEA 200, Intro/Theatre Practicum . . . . .	1
THEA 201 Theatre Practicum . . . . .	9
THEA 266, Voice & Movement for the Actor . . . . .	3
THEA 270, 271, Stagecraft, Costume Const . . . . .	6
THEA 275, 276, Makeup Design I, II . . . . .	6
THEA 280, World Theatre . . . . .	3
THEA 350, Studio Theatre . . . . .	1
THEA 365, 465, Directing I, II . . . . .	6
THEA 372, Stage Management . . . . .	3
THEA 375, Intro to Stage Design . . . . .	3
THEA 440, Adv Proj in Production . . . . .	3
THEA 450, Capstone Experience . . . . .	3
THEA 461, 462, Acting Styles I, II . . . . .	6
THEA 466, Advanced Voice for the Actor . . . . .	2
THEA 467, Advanced Movement for the Actor . . . . .	2
THEA 468, Business of Acting . . . . .	3
THEA 480, 481, Hist & Lit of Theatre I, II . . . . .	6
Total . . . . .	90

**Plus 6 credits from the following:**

ENGL 344, American Drama . . . . .	3
ENGL 462, Modern European Drama . . . . .	3
ENGL 484, Restor & 18th Century Drama . . . . .	3
Total . . . . .	6

**B.F.A. with a Major in Theatre Arts: Design and Technical Theatre Track**

<i>Major Requirements</i>	<i>Credits</i>
ART 210, 211, Art History I, II . . . . .	6
MUSC 104, 105, Intro to Music Lit I, II . . . . .	6
THEA 161, Acting I . . . . .	3
THEA 200, Intro/Theatre Practicum . . . . .	1
THEA 201, Theatre Practicum . . . . .	9
THEA 261, Acting II . . . . .	3
THEA 270, 271, Stagecraft, Costume Const . . . . .	6
THEA 275, 276, Makeup Design I, II . . . . .	6
THEA 280, World Theatre . . . . .	3
THEA 365, Directing I . . . . .	3
THEA 371, Technical Drawing . . . . .	3
THEA 372, Stage Management . . . . .	3
THEA 375, Intro/Stage Design . . . . .	3
THEA 377, Lighting Design . . . . .	3
THEA 378, Sound Design . . . . .	3
THEA 440, Adv Proj in Production . . . . .	3

	<i>Credits</i>
THEA 450, Capstone Experience . . . . .	3
THEA 463, Portfolio Review . . . . .	2
THEA 475, 476, Design for the Stage I, II . . . . .	6
THEA 480, 481, Hist & Lit of Theatre I, II . . . . .	6
Total . . . . .	81

**And 6 credits from the following:**

ART 130, 230, Drawing I, II . . . . .	6
ART 120, 220, Painting I, II . . . . .	6
Total . . . . .	6

**And 9 credits from the following:**

ARCH 321, 322, History of Architecture I, II . . . . .	6
ADFH 310, History of Fashion . . . . .	3
ADFH 315, 316 History of Interiors I, II . . . . .	6
ATID 355, Flat Pattern Design & Draping . . . . .	3
Total . . . . .	9

**Minor in Theatre Arts**

Students must take two of the following courses as part of the 23 credit minor:

	<i>Credits</i>
THEA 110, Intro to Theatre Arts <i>and/or</i> . . . . .	3
THEA 180, Dramatic Lit & Style <i>and/or</i> . . . . .	3
THEA 280, World Literature . . . . .	3
Credits . . . . .	6

**General Studies Emphasis requires the additional 17 credits:**

THEA 161, Acting I . . . . .	3
THEA 201, Theatre Practice . . . . .	2
THEA 270, Stagecraft <i>or</i> . . . . .	3
THEA 271, Costume Construction . . . . .	3
THEA 275, Makeup Design I . . . . .	3
THEA 365, Directing I . . . . .	3
THEA 375, Intro to Stage Design . . . . .	3
Total . . . . .	17

Emphases in the theatre arts minor also are available in the following areas:

- Performance
  - General Theatre Design and Technology
  - Scenic Design and Technology
  - Costume Design and Technology

**Musical Theatre**

Contact the Division of Fine Arts for detailed curricula.

**Department of History****[www.ndsu.edu/history](http://www.ndsu.edu/history)**

By engaging in the fascinating study of how people in the past understood their worlds, History department graduates will be prepared to comprehend and think critically about the present by understanding how it has been shaped by the past. In their studies they will learn how to evaluate the strengths and weaknesses of alternative explanations for historical events, how to interpret primary and secondary materials to form valid conclusions, how to analyze components of historical events, and how to synthesize and apply their knowledge in an original research project.

The History department offers both a B.A. and a B.S. degree in History. The B.A. degree requires the completion of two years of a foreign language at the college level and is recommended for students desiring a rich level arts education or planning for graduate school or law school. The B.S. degree does not have a foreign language requirement but, instead, requires an appropriate minor. Students transferring to NDSU must complete at least 50 percent of their history credits at North Dakota State University.

Both the B.A. and the B.S. degree require 39 credits in history distributed as follows:

**B.A. or B.S. in History**

100-200 level courses (9-15 credits)

**300-400 level courses (at least 24 credit total)****including the following:**

HIST 390, Historical Research and Writing (3 credits)  
HIST 489, Senior Seminar (3 credits)

**Distribution requirement (6+6+3 distributed****among the following categories):**

- US History, 300-400 level
- European History, 300-400 level
- Widening Horizons, 300-400 level
- 300-400 level sequence (6 credits) in one distribution category
- History electives at the 300-400 level (3-9 credits)

Lists of approved courses for the distribution and sequence requirements are at the NDSU History department homepage: [www.ndsu.edu/history](http://www.ndsu.edu/history).

**Recommended '06-07 Curriculum B.A. with a Major in History**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
ENGL 110, 120, College Composition, I, II . . . . .	3	3
Foreign Lang 101, 102, First-Year . . . . .	4	4
COMM 110, Fund of Public Speaking . . . . .	3	--
HIST 100-200 Level . . . . .	3	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Science & Technology . . . . .	--	3
Wellness . . . . .	2	--
Quantitative Reasoning . . . . .	--	3
Totals . . . . .	16	16

**Second Year**

HIST 100-200 Level . . . . .	3	3
HIST 390, Historical Research & Writing . . . . .	--	3
Foreign Lang 201, 202, Second-Year . . . . .	3	3
Science & Technology . . . . .	4	3
Social & Behav Science . . . . .	6	3
Totals . . . . .	16	15

**Third Year**

History Distribution Require & two sem seq . . . . .	3	3
History Distribution Requirement . . . . .	3	3
Fine Arts . . . . .	--	3
Cultural Diversity & Global Perspectives . . . . .	3	3
Social & Behav Science <i>or</i> Fine Art . . . . .	3	--
Free Electives . . . . .	3	3
Totals . . . . .	15	15

**Fourth Year**

HIST 489, Senior Seminar . . . . .	3	3
HIST Electives in Upper Level . . . . .	6	3
Free Electives . . . . .	6	8
Totals . . . . .	15	14

**Curriculum Total . . . . . 122**

History majors can prepare themselves for careers in secondary education by completing a double major with either a B.A. or B.S. in History and B.A. or B. S. in History Education. Students selecting the B.A. option will need two years of a foreign language. The department advises students to choose History as their primary major. History education majors are required to complete a course in North Dakota history and three credits of history other than European or United States. They must also complete one 200-level or above course in anthropology, geography, political science, psychology, or sociology.

The double major in History and History Education requires 39 credits in History distributed as follows:

## B.A. or B.S. in History and B.A. or B.S. in History Education

**100-200 level courses (9-15 credits) including the following:**

HIST 220, North Dakota History (3 credits)

**300-400 level courses (at least 24 credits total) including the following:**

HIST 390, Historical Research and Writing (3 credits)  
HIST 489, Senior Seminar (3 credits)

**Distribution requirements (6+6+3 distributed among the following categories):**

- US History, 300-400 level
- European History, 300-400 level
- Widening Horizons, 300-400 level
- 300-400 level sequence (6 credits) in one distribution category
- History electives at the 300-400 level (3-9 credits)

Lists of approved courses for the distribution and sequence requirements and courses recommended for History Education majors are at the NDSU History department homepage: [www.ndsu.edu/history](http://www.ndsu.edu/history).

## B.A. or B.S. in Public History

The major requires 48 credits in history courses, including a nine-credit internship. An additional 18 credits in supplementary vocational courses or an approved minor to prepare for a career in public history are also required. The Public History option prepares students for employment in fields such as archives and museums, historical editing, historic preservation, costume conservation, and archeology. The 18 credit supplementary vocational courses are divided into three tracks: 1) museums, intended to prepare students for work as a curator, interpreter, or administrator in museums, 2) archives, intended to prepare students for work with documents and/or photographs in a archival repository, and 3) historical preservation, intended to prepare students to work with the National Historic Preservation legislation to identify historic buildings and sites throughout the nation. For more details regarding the courses available for the 18 credit vocational supplement, please see the department home page: [www.ndsu.edu/history/index.htm](http://www.ndsu.edu/history/index.htm).

**100-200 level courses (9-15 credits) including the following:**

HIST 251, Intro to Public History (3 credits)  
HIST 252, Intro to Museum Work (3 credits)  
HIST 104, U.S. Since 1877

**300-400 level courses (at least 24 credits total) including the following:**

HIST 390, Historical Research & Writing (3 credits)  
HIST 489, Senior Seminar (3 credits)

**Distribution requirements (6+6+3 distributed among the following categories):**

- US History, 300-400 level
- European History, 300-400 level
- Widening Horizons, 300-400 level
- 300-400 level sequence (6 credits) in one distribution category

**History electives at the 300-400 level (3-9 credits) including the following:**

HIST 401, Archival Theory and Practice (3 credits)  
HIST 403, Archival Photography (3 credits)

**Additional Public History Core Requirements**

ARCH 322, History of Architecture II (3 credits)  
HIST 496, Field Exp (Approved Internship) (9 credits)

Lists of approved courses for the distribution and sequence requirements and courses recommended for the Public History option are at the NDSU History Department homepage: [www.ndsu.edu/history](http://www.ndsu.edu/history).

## History Minor

Students who minor in History are required to complete 9 credits of 100-200 level courses and 9 credits of 300-400 level courses.

## Humanities/Philosophy

Humanities is a theme-centered interdisciplinary program in the arts, history, literature, philosophy, and religion. Through interdisciplinary study, students develop an awareness and understanding of the major events and ideas that have shaped the civilization in which they live.

## Humanities Major

The Humanities major is an interdepartmental program designed to offer perspectives in depth and breadth from related disciplines. The major leads to the B.A. degree and consists of 39 credits distributed among the following requirements:

### Humanities Major Core Requirements

	<i>Credits</i>
ENGL 240 & 335 (or HUM 385) . . . . .	6
UNIV 401, 402, 403, 404 or approved interdisciplinary course . . . . .	3

**A 6 credit sequence from each of the following areas:**

1. Fine Arts (history, interpretation, and philosophy of fine arts, rather than the applied arts) or Religion . . . . .	6
2. History or Literature . . . . .	6
3. Philosophy or Architecture . . . . .	6
HUM 304 (Humanities Tutorial) . . . . .	3-6
Electives at 300-400 level . . . . .	6-9
Total . . . . .	39

Two years of a foreign language, classical or modern, western or non-western, are required for both the major and the minor.

### Recommended '06-07 Curriculum Humanities Major

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
ENGL 110, 120, College Composition I, II . . . . .	3	3
UNIV 189, Skills for Academic Success . . . . .	1	
Foreign Language . . . . .	4	4
Quantitative Reasoning . . . . .	3	
Science & Technology . . . . .	3	3
Social & Behavioral Sciences . . . . .	3	3
Wellness . . . . .	2	
Totals . . . . .	16	16

#### Second Year

COMM 110 & Free Elective . . . . .	3	3
Fine Arts Sequence . . . . .	3	3
Foreign Language . . . . .	3	3
Science & Tech & Free Elective . . . . .	4	3
Social & Behavioral Sciences . . . . .	3	3
Totals . . . . .	16	15

#### Third Year

ARCH 321 & 322 (or PHIL sequence) . . . . .	3	3
ENGL 240 & 335 . . . . .	3	3
UNIV 401, 402, 403, or 404 & Free Elective . . . . .	3	3
Literature Sequence . . . . .	3	3
Free Electives . . . . .	3	3
Totals . . . . .	15	15

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Fourth Year</b>		
HUM 304 (Humanities Tutorial) . . . . .	3	2
History Electives . . . . .	3	3
Humanities Electives . . . . .	3	3
Free Electives . . . . .	6	7
Totals . . . . .	15	15
<b>Curriculum Total . . . . .</b>	<b>123</b>	

## Humanities Minor

The Humanities minor is designed to stimulate creative expression and complement a major field of study. The minor consists of 21 credits distributed among the following requirements:

### Humanities Minor Core Requirements

	<i>Credits</i>
ENGL 240 & 335 . . . . .	6
Two upper-level sequences in philosophy, religion, anthropology, history, literature, art history, history of theatre, or history of music . . . . .	12
UNIV 402, 403, 404 or approved interdisciplinary course . . . . .	3
Total . . . . .	21

## Philosophy-Humanities

North Dakota State University, through a cooperative arrangement with Cardinal Muench Seminary, offers students a Philosophy curriculum that may be approached either as an interdisciplinary Philosophy minor or a Philosophy-Humanities major or minor.

The Philosophy-Humanities major consists of 30 semester credits. Of these, 21 credits must be taken from the required courses below. Nine elective credits, which can be independent studies, complete the major.

### Philosophy-Humanities Major Core Requirements

	<i>Credits</i>
PHIL 101, Introduction to Philosophy or HUM 256, Questions of Philosophy . . . . .	3
PHIL 210/RELS 210, Introduction to Ethics or HUM 367, The Acting Person (Ethics) . . . . .	3
PHIL 257/HUM 257, Traditional Logic . . . . .	3
PHIL 322, Medieval Philosophy or HUM 399, Medieval Philosophy or HUM 356, Ancient Philosophy . . . . .	3
PHIL 323, Modern Philosophy or PHIL 476/HUM 476, Phil of the Modern Period or PHIL 477/HUM 477, Contemporary Philosophy . . . . .	3
PHIL 366/HUM 366, Metaphysics or HUM 399, Epistemology . . . . .	3
<b>Capstone Experience:</b>	
PHIL 487/HUM 487, Aesthetics or PHIL/HUM 486, Philosophy and Literature . . . . .	3
Philosophy-Humanities Electives . . . . .	6
Total . . . . .	30

The major can result in either a B.A. or B.S. degree. Each degree has additional university and College of Arts, Humanities and Social Sciences requirements that must be fulfilled. For example, a B.A. requires two years or the equivalent of a foreign language, while the B.S. requires a minor in another field. Please check the university and college pages addressing additional requirements that must be fulfilled.

## Recommended '06-07 Curriculum Philosophy-Humanities Major

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
ENGL 110, 120, College Composition I, II . . . . .	3	3
UNIV 189, Skills for Academic Success . . . . .	1	--
PHIL 101 <b>or</b> HUM 256 . . . . .	3	--
PHIL 257/HUM 257 . . . . .	3	--
PHIL 210 <b>or</b> HUM 367 . . . . .	--	3
Quantitative Reasoning . . . . .	--	3
Science & Technology . . . . .	3	3
Social & Behavioral Science . . . . .	3	3
Totals . . . . .	16	15

<b>Second Year</b>		
COMM 110 . . . . .	3	--
Minor or Foreign Language . . . . .	3-4	3-4
Global Perspectives . . . . .	--	3
Humanities/Fine Arts . . . . .	3	3
PHIL 366/HUM 366 <b>or</b> HUM 399 . . . . .	3	--
PHIL/HUM Elective . . . . .	--	3
Science & Tech & Free Elective . . . . .	4	--
Wellness . . . . .	--	2
Totals . . . . .	16-17	14-15

<b>Third Year</b>		
PHIL 322 <b>or</b> HUM 358 <b>or</b> 359 . . . . .	3	--
PHIL 323 <b>or</b> PHIL/HUM 476 <b>or</b> 477 . . . . .	--	3
Social & Behavioral Science . . . . .	3	--
Social Science <b>or</b> Fine Arts . . . . .	--	3
Minor <b>or</b> Foreign Language . . . . .	3	3
Minor <b>or</b> Free Elective . . . . .	6	6
Totals . . . . .	15	15

<b>Fourth Year</b>		
PHIL/HUM Capstone . . . . .	--	3
PHIL/HUM Elective . . . . .	3	3
Cultural Diversity . . . . .	3	--
Minor <b>or</b> Free Elective . . . . .	10	9
Totals . . . . .	16	15

**Curriculum Totals . . . . . 124-126**

### Philosophy-Humanities Minor

The Philosophy-Humanities minor consists of 21 semester credits: the major required courses listed below plus six elective credits from the elective philosophy courses, including independent studies.

### Philosophy-Humanities Minor Core Requirements

	<i>Credits</i>
PHIL 101, Introduction to Philosophy <b>or</b>	
HUM 256, Questions of Philosophy . . . . .	3
PHIL 257/HUM 257, Traditional Logic . . . . .	3
PHIL 366/HUM 366, Metaphysics . . . . .	3
PHIL 210/HUM 210, Introduction to Ethics <b>or</b>	
HUM 367, The Acting Person (Ethics) . . . . .	3
PHIL 487/HUM 487, Aesthetics . . . . .	3
Philosophy-Humanities electives . . . . .	6
Total . . . . .	21

### Elective Philosophy-Humanities Courses

PHIL 215, Contemporary Moral Issues <b>or</b>	
PHIL 216, Business Ethics . . . . .	3
HUM 304, Humanities Tutorial . . . . .	1-3
PHIL 359/HUM 359, Thomas Aquinas . . . . .	3
PHIL 486/HUM 486, Philosophy & Literature . . . . .	3
PHIL 487/HUM 487, Aesthetics . . . . .	3
PHIL 494/HUM 494, Independent Study . . . . .	1-3

### Independent Study

Independent study may be pursued by students wanting to read a special philosophical topic (e.g. aesthetics) or read the work of a particular philosopher. To initiate independent study, the student must contact a member of the faculty listed above.

### Philosophy

North Dakota State University, through a cooperative arrangement with Cardinal Muench Seminary, offers students a philosophy curriculum that may be approached either as an interdisciplinary Philosophy minor or a Philosophy-Humanities major or minor.

### The Program

People have always had questions about the world in which they live. Whether these questions are about truth, beauty, and goodness, or about whether life has any meaning, people find questions to ask. Over the centuries, many minds have addressed these questions. By means of dialogue, intuition, logic, and critical thought, philosophers have created pathways to wisdom and an understanding of the human condition.

Please see major and minor requirements under Philosophy-Humanities.

### Religious Studies

From 1932 to 1977 the School of Religion was independent from the university but in close association with it. Currently, the School of Religion continues as a part of the College of Arts, Humanities and Social Sciences.

### Religious Studies Minor

A minor in religious studies is available. The minor consists of 20 credits of which 12 credits may be at the 100-200 level and eight credits must be at the 300-400 level. For advice on the distribution of the remainder of the electives consult with the director of the School of Religion.

### Seminary — Cardinal Muench

The Cardinal Muench Seminary is a private institution in Fargo. The program of courses offered at and by the seminary supplements the course offerings of the College of Arts, Humanities and Social Sciences at NDSU. The seminary is primarily intended to prepare students to enter any recognized school of divinity after the completion of the general requirements for graduation. Most course offerings at the seminary are also open to NDSU students for the enrichment of cultural, linguistic, or philosophical programs of studies and, at the discretion of the student's college, for major degree programs.

In addition to other university requirements, a major in classical languages is a minimum of 30 credits in Latin and Greek (excluding 100-level Latin courses) including a minimum of eight credits in Greek. A minor in classical languages is 20 credits (excluding 100-level Latin courses) including a minimum of eight credits in Greek. A minor in Biblical languages is 20 credits of at least six credits in Hebrew and eight credits in Greek.

### Social Science Major

A special interdisciplinary Social Science major is available.

It includes courses from disciplines such as history, economics, political science, geography, psychology, sociology, or anthropology. Students should obtain the appropriate curriculum sheets from the School of Education, Office of Registration and Records, or the Arts, Humanities and Social Sciences Dean's Office.

Before taking advanced course work required for the Social Science major, the student should complete at least one year in each of the required disciplines. In addition, students should complete course work in economics and world history.

Students who wish to prepare for high school teaching should make this intention known to the School of Education before entering their junior year

to ensure that state teacher certification requirements are met.

Students not planning to teach may major in Social Science leading to either the B.A. or B.S. degree. These students should declare their majors at the Office of Registration and Records and be assigned advisors with whom they will plan programs of study. The advisor and the Office of Registration and Records must approve the program of study in advance.

## Department of Modern Languages

### [www.ndsu.edu/modernlanguages](http://www.ndsu.edu/modernlanguages)

Today's interconnected world generates the need to be able to communicate in more than one language. As networks of international cooperation and exchange grow in complexity, particularly among governments and businesses, those who possess foreign language competence become increasingly valuable. Moreover, it has been shown that learning a second language can improve one's overall writing and speaking ability.

The Department of Modern Languages offers major programs in French and Spanish, with courses in German and first-year Arabic. Study Abroad and experience of living in another culture are an integral part of majoring in languages at North Dakota State University. Through the Tri College University consortium, NDSU students may also study Chinese, Japanese, Norwegian, and Russian for full credit. Classical languages are available in cooperation with Cardinal Muench Seminary.

### Language Placement

Students must adhere to the placement requirements when enrolling in a language course for the first time at NDSU. Enrollment in a course below the student's background level will result in no credit for that course.

If, after appropriate placement, the student's instructor recommends that because of exceptional circumstances the student should be placed at a lower level, full credit at the new level may be granted upon approval by the chair of the department.

### Student's Language Background

No previous study or limited experience . . . . . Course 101  
in the language (less than two high  
school units/years)

Two or three high school units/years **or** . . . . . Course 201  
one year college credit

Four or more high school units/years **or** . . . . . Course 311  
two years college credit; Bachelor of Arts  
language requirement is satisfied

All other cases . . . . . Level to be determined by department

### Credit for Advanced Language Placement

A student placed at an advanced level may receive NDSU credit for those courses waived, upon fulfillment of the following conditions.

1. The student has completed no previous college-level credit in that language;
2. The student enrolls consecutively in at least two courses within the same level, i.e., 201-202, (intermediate); 311-312, (advanced); and receives a grade of B or better, (courses may not be taken pass/fail);
3. The student submits a petition form obtained from the Department of Modern Languages, signed by the instructor and the department chair.

## Major and Minor Programs

Language majors and minors may be obtained in French and Spanish. German is available through the third-year level.

A major consists of a minimum of 24 credits above the intermediate level. At least nine of these credits must be in advanced language; the remainder may be chosen from a variety of courses in linguistics, literature, and culture. A minimum of one year of a second foreign language at NDSU, or the equivalent, is required. French and Spanish majors must have a cumulative 3.0 grade point average for courses in the major, including credits received for study abroad.

A minor necessitates completion of a minimum of 18 credits beyond the intermediate level. At least nine of these credits must be in advanced language (normally conversation/composition).

## Recommended '06-07 Curriculum French as Example

	Credits	
<i>First Year</i>	<i>F</i>	<i>S</i>
ANTH 111, Intro to Anthropology . . . . .	3	--
ENGL 110, 120, College Composition I, II . . . . .	3	3
FREN 101, 102, First-Year French I, II . . . . .	4	4
HIST 101, 102, Western Civ I, II . . . . .	3	3
SOC 110, Intro to Sociology . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Wellness . . . . .	--	2
Totals . . . . .	14	15

### *Second Year*

BIOL 124, Environmental Science . . . . .	3	--
COMM 110, Fund of Public Speaking . . . . .	--	3
ENGL 220, Intro to Literature . . . . .	3	--
FREN 201, 202, Second-Year French I, II . . . . .	3	3
GEOG 161, World Regional Geog . . . . .	3	--
MATH 104, Finite Mathematics . . . . .	--	3
POLS 115, American Government . . . . .	--	3
POLS 220, International Politics . . . . .	3	--
PSYC 111, Intro Psychology . . . . .	--	3
Totals . . . . .	15	15

Junior and senior year course work will be determined in consultation with a faculty advisor according to the student's background and interests.

## Career Directions

Experience has shown that many students, with or without declared modern language majors or minors, find a second language background especially useful when combined with preparation in another professional field. Examples include public relations, journalism, TV and radio broadcasting, hotel management, publishing and editing, government service, banking, and management.

One of the more promising occupational fields for language students has been international business. Individuals with foreign language skills are finding increased opportunities with multinational corporations, especially in management and marketing. Many companies with international ties recruit candidates possessing linguistic training because they recognize its correlation with effective verbal and written communication. Regardless of their specific majors, students are encouraged to contact the department for information and advice on career application of foreign language skills.

Students wishing to prepare for high school teaching should make this intention known to the School of Education and to the Department of Modern Languages to make certain that the requirements for state certification are met. Competitiveness and flexibility in the job market tend to be greater if certification can be obtained in two or more different areas.

## Department of Sociology and Anthropology

[www.ndsu.edu/socanth](http://www.ndsu.edu/socanth)

The Department of Sociology and Anthropology offers courses and programs that focus on the study of human behavior in social settings. The department offers a major and minor in emergency management, anthropology, and sociology at the undergraduate level.

### Anthropology Major

The Department of Sociology and Anthropology offers a major and minor in Anthropology. Anthropology is the study of humanity in all of its breadth and depth. It sets itself apart from other social sciences in its aspiration to understand all aspects of humankind. As a discipline, anthropology studies and celebrates human diversity. At the same time, it reminds us that despite our different cultures we are all members of the human family. We share a common nature and a common destiny.

In the anthropology program, students have the opportunity to explore the four branches of anthropology. At NDSU, the focal area has been North America and Oceania, although other areas of the world are in the curriculum. The Native American specialization reflects both the expertise of the anthropological faculty and the relevance of this focus to the northern Plains region. Additional emphasis within anthropology includes archaeology (the study of past cultures through the analysis of material remains), biological anthropology (the study of skeletal and mummified human remains for the analysis of diet, health and other aspects of lifestyle), and folklore (the study of expressive culture, particularly unrecorded traditions).

Anthropology consists of four subdisciplines: culture or social anthropology, physical or biological anthropology, archaeology, and linguistics. Thus, anthropologists study past and present cultures, historical and structural aspects of languages, and the biological aspects of past and present human populations. The 31 credit requirements include ANTH 111, SOC 110, two of the following four courses: ANTH 204, 205, 206, 208; ANTH 480 or other theory-or-method-based course approved by the advisor; and ANTH 489 (offered spring semester only). In addition to the 16 core credits, majors must complete 15 elective credits in anthropology.

### Recommended '06-07 Curriculum Anthropology Major

	Credits	
<i>First Year</i>	<i>F</i>	<i>S</i>
ANTH 111, Intro to Anthropology . . . . .	3	--
ENGL 110, 120, College Composition I, II . . . . .	3	3
COMM 110, Fund of Public Speaking . . . . .	3	--
UNIV 189, Skills for Academic Success . . . . .	1	--
SOC 110, Intro to Sociology . . . . .	--	3
Humanities & Fine Arts Gen Eds. . . . .	3	6
Minor or Foreign Language . . . . .	4	4
Totals . . . . .	17	16

### *Second Year*

ANTH 204, Archaeology & Prehistory <b>or</b>		
ANTH 205, Human Origins <b>or</b>		
ANTH 206, Peoples of the World <b>or</b>		
ANTH 208, Folklore & Culture (choose two) . . . . .	3	3
Humanities & Fine Arts Electives . . . . .	3	3
Science & Technology Electives . . . . .	3	3
Wellness . . . . .	2	--
Minor Elective or Foreign Language . . . . .	6	6
Totals . . . . .	17	15

	Credits	
<i>Third Year</i>	<i>F</i>	<i>S</i>
STAT 330, Intro Statistics . . . . .	3	--
Anthropology Electives . . . . .	3	3
Anthropology Electives <b>or</b>		
Other Electives at 300-400 level . . . . .	3	1
Humanities <b>or</b> Fine Arts . . . . .	3	--
Minor Elective <b>or</b> Foreign Language . . . . .	3	6
Science & Technology Elective w/Lab . . . . .	--	4
Totals . . . . .	15	14

### *Fourth Year*

ANTH 480, Development of Anth Theory <b>or</b>		
Anthropology Elective . . . . .	--	3
ANTH 489, Capstone in Anthropology . . . . .	--	1
ANTH 494, Independent Study <b>or</b>		
ANTH 496, Field Experience . . . . .	2	--
Anthropology Electives . . . . .	3	3
Anthropology Electives <b>or</b>		
Other Electives at the 300-400 Level . . . . .	3	3
Minor Electives or Free Electives . . . . .	6	4
Totals . . . . .	14	14

**Curriculum Total . . . . . 122**

### Anthropology Minor

The 18 credit requirement includes ANTH 111, SOC 110, two of the following: ANTH 204, 205, 206, 208, and two additional anthropology courses from the 300 and 400 level offerings.

### Emergency Management Major

The Department of Sociology and Anthropology offers a major and minor in Emergency Management at the undergraduate level.

Emergency Management is a growing profession and discipline of study addressing all phases of disaster and risk management. The mission of the major is to create a cadre of graduates with extensive theoretical and applied knowledge in emergency management and disaster research. The program covers natural and technological disasters as well as issues of homeland security and homeland defense.

Numerous career opportunities are available to those graduating with an emergency management major. Positions are available at all levels of government including city, country, state and federal and the military. A wide variety of local, national, and international voluntary organizations routinely hire graduates educated in emergency management for humanitarian relief efforts and related activities. Finally, there is increasing need in the private, business sector for emergency management and crisis management to address business and operational continuity. There has been an upward trend in the consequences of natural and technological disasters in the last 30 years. As a result, emphasis is being placed on the vulnerability and risk reduction to natural disasters such as Hurricane Katrina and human made disasters such as September 11, 2001 providing excellent job prospects for graduates in this field.

All aspects of society can be impacted by disasters, so the emergency management major is built on a core of sociology/anthropology courses: ANTH 111, SOC 110, 340, 341, and 422. Related to this sociology core, the major requires STAT 330 as a prerequisite or co-requisite for SOC 340, but STAT 330 does not count toward the 47 credits in the major. Additionally, the major includes two broad, introductory courses, EMGT 201 and SOC 220, a law and regulation course, EMGT 453, plus four disaster phase courses: preparedness (EMGT 411), mitigation (EMGT 413), response (EMGT 431), and recovery (EMGT 483). The major requires EMGT 201 as a prerequisite for the four disaster phases and an ethics course, Contemporary Moral Issues (PHIL 215) or Introduction to Ethics (PHIL 210), as a prerequisite

for EMGT 453. To complete the major, students should take six credits of electives and six credits of practicum (EMGT 496) and a one credit capstone course (EMGT 489) in emergency management. The elective credits should be selected from undergraduate emergency management courses and/or emergency management related courses in other disciplines. Students are also encouraged to pursue internship opportunities in emergency management. Internship credits can be applied toward the required six credits of electives.

### Emergency Management Minor

The Emergency Management minor provides a multidisciplinary background in all phases of disaster and risk management to natural and human made disasters, and consist of 21 credits. Students must take EMGT 201, SOC 220, EMGT 453 and the following disaster stage courses: preparedness (EMGT 411), mitigation (EMGT 413), response (EMGT 431), and recovery (EMGT 483). The minor requires EMGT 201 as a prerequisite for the four disaster phases courses and an ethics course, PHIL 210, as a prerequisite for EMGT 453.

### Recommended '06-07 Curriculum Emergency Management Major

	Credits	
	F	S
<b>First Year</b>		
ANTH 111, Intro to Anthropology . . . . .	--	3
COMM 110, Fund of Public Speaking . . . . .	3	--
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 104, Finite Math . . . . .	--	3
SOC 110, Intro to Sociology . . . . .	3	--
UNIV 189, Skills for Academic Success . . . . .	1	--
Wellness . . . . .	2	--
Humanities & Fine Arts . . . . .	3	6
Totals . . . . .	15	15

#### Second Year

EMGT 201, Intro/Emergency Mgmt . . . . .	3	--
Soc 220, Sociology of Disaster . . . . .	3	--
Phil 215 or 210, Ethics . . . . .	3	--
EMGT 453, Emerg. Man. Law & Reg. . . . .	3	3
Humanities & Fine Arts . . . . .	--	3
Science & Technology . . . . .	3	3
Electives, Modern Lang <b>or</b> Minor . . . . .	3	6
Totals . . . . .	15	15

#### Third Year

SOC 340, 341, Soc Research Meth, Lab . . . . .	3,1	--
SOC 422, Dev/Social Theory . . . . .	--	3
STAT 330, Intro Statistics . . . . .	3	--
EMGT 411, Community Disaster Prep . . . . .	3	3
EMGT 413, Building Disaster Resilient Comm. . . . .	--	3
Science & Technology/with Lab . . . . .	3	4
Social/Behavioral Sciences . . . . .	3	3
Emergency Management Practicum . . . . .	--	3
Totals . . . . .	16	16

#### Fourth Year

EMGT 431, Disaster Response Operations . . . . .	3	--
EMGT 483, Holistic Disaster Recovery . . . . .	--	3
Emergency Management Electives . . . . .	3	3
EMGT 489, Capstone . . . . .	--	1
Emergency Management Practicum . . . . .	3	3
Electives or Minor . . . . .	6	8
Totals . . . . .	15	15

**Curriculum Total . . . . . 122**

## Sociology Major

Sociology is the study of social structure, social inequality, social change and social interaction that comprise societies.

The curriculum is structured to introduce majors to the sociology discipline and provide them with conceptual and practical tools for understanding social behavior and societies. Areas of study include small groups, populations, inequality, diversity, gender, social change, families, community development, organizations, medical sociology, and aging.

The 38-credit requirement includes the following core: ANTH 111, SOC 110, 150, 340, 341, 422, and 489. (Note: An introductory statistics course is a prerequisite for SOC 340.) In addition to the 17 core credits, majors must complete 4 gateway courses (SOC 115, 202, 214 and 233). The remaining 9 credits are electives in sociology.

### Recommended '06-07 Curriculum Sociology Major

	Credits	
	F	S
<b>First Year</b>		
ANTH 111, Intro to Anthropology . . . . .	--	3
COMM 110, Fund of Public Speaking . . . . .	3	--
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 104, Finite Math . . . . .	--	3
SOC 110, Intro to Sociology . . . . .	3	--
UNIV 189, Skills for Academic Success . . . . .	1	--
Soc 150, Cornerstone on Sociology . . . . .	--	3
Humanities & Fine Arts . . . . .	3	3
Wellness . . . . .	2	--
Totals . . . . .	15	15

#### Second Year

Soc 115, Social Problems . . . . .	3	--
Soc 214, Social Interaction . . . . .	3	--
Soc 233, Soc of Org & Work . . . . .	--	3
Soc 202, Minorities . . . . .	--	3
Humanities & Fine Arts . . . . .	3	--
Science & Technology, Lab . . . . .	--	4
Science & Technology Elective . . . . .	3	3
Electives, Modern Lang <b>or</b> Minor . . . . .	4	3
Totals . . . . .	16	16

#### Third Year

SOC 340, 341, Soc Research Meth, Lab . . . . .	3,1	--
SOC 422, Dev/Social Theory . . . . .	3	--
STAT 330, Intro Statistics . . . . .	3	--
Humanities & Fine Arts Electives . . . . .	--	3
Sociology Electives at 400 Level . . . . .	--	6
Social/Behavioral Sciences . . . . .	3	3
Electives <b>or</b> Minor . . . . .	3	3
Totals . . . . .	16	15

#### Fourth Year

Soc 496, Internship (optional) . . . . .	.6	--
SOC 489, Capstone . . . . .	--	1
Sociology at 400 level . . . . .	3	--
Sociology or other electives at 300-400 Level . . . . .	3	10
Electives <b>or</b> Minor . . . . .	3	3
Totals . . . . .	15	14

**Curriculum Total . . . . . 122**

## Sociology Minor

Because the study of sociology helps to understand and explain shared behavior of people in organized groups, a minor is an asset to majors in many other fields.

The 19-credit requirement includes ANTH 111, SOC 110, 340, 341, and 422. At least six additional credits must be taken at the 300 or 400 level.

### Community Development Minor

The Community Development minor is an applied, multidisciplinary program consisting of 18 credits that includes course work and an experiential component. Requirements include SOC 405; a three-credit internship; and a minimum of three credits in each of the following areas: economics, business, and social science. Contact the department for the approved courses in each area.

### General Information

The department offers a wide range of part-time and full-time internships. Placements may include fieldwork in business, community agencies, health care, and aging throughout the region. Upon approval of the student's application to the department and the sponsoring agency, students are placed in an environment in which both the applied and intellectual aspects of the professional experience are emphasized. The department also works with cooperative education and service learning activities to support experiential education. Interested students should contact the department chair.

# COLLEGE OF BUSINESS

[www.ndsu.edu/cba](http://www.ndsu.edu/cba)

Putnam Hall 105 (701) 231-8651

Ronald D. Johnson, Dean

The College of Business is committed to providing our students with a solid education in the functional areas of business, a systematic exposure to the global business issues they will face in their careers, and an introduction to applying the technologies that will be a part of their work life. In addition, students may choose elective courses that will help prepare them for careers in specific areas in which they have an interest.

**Undergraduate majors offered are:** Accounting, Accountancy, Business Administration, and Management Information Systems. Academic minors are Accounting, Agribusiness (corporate track), Business Administration, Fraud Investigation, Logistics, and Management Information Systems.

The College of Business is accredited by AACSB International – The Association to Advance Collegiate Schools of Business.

## Admission Requirements

Students who wish to major in Accounting, Accountancy, Business Administration, or Management Information Systems at NDSU enroll as pre-professional students in the College of Business for their freshman and sophomore years. Pre-professional students apply for admission at least one semester prior to enrolling in the professional program. To be considered for admission, students must submit to the Dean's Office a completed application, application fee, and current NDSU transcript.

Admission to the professional program requires successful completion of all pre-professional requirements, junior standing, and a minimum 2.50 institutional cumulative grade-point average. Students must be admitted into a professional program prior to enrolling in the advanced 300-400-level accounting, business administration, and/or management information systems courses.

The College of Business has specific policies on transfer course evaluations. The transfer of business courses into the professional program is limited to credit earned at AACSB accredited business programs. Contact the COB Student Service Center for more information.

## Degree Programs

The College of Business offers undergraduate programs leading to the Bachelor of Science and Bachelor of Accountancy degrees. A Master of Business Administration is offered and is described in the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

## Degree Requirements

Students are required to complete the course requirements of one of the curricula in the college. Requirements for graduation are those in existence at the time of admission to the professional program. In addition, all majors must maintain a 2.50 institutional cumulative grade-point average.

Of the credits completed in residence, at least 30 credits must be in 300- and 400-level accounting, business administration, and/or management information systems courses while enrolled in the professional program.



## Practicum Requirement

Majors in the College of Business are required to complete a three-credit practicum experience while enrolled in the professional program. This requirement prepares students for challenges of the business world through practical experience in their primary area of study. Students must consult with their academic advisor and obtain approval prior to enrolling in the practicum. The following choices are available to meet the practicum requirement:

ACCT 413, Accounting Internship  
 BUSN 413, Business Internship  
 BUSN 415, Small Business Institute  
 BUSN 486, Senior Thesis  
 IME 456, Program and Project Management  
 UNIV 397, Cooperative Education  
 UNIV 492, Study Abroad

## Cooperative Education

Cooperative Education, a program of the Career Center, offers undergraduate and graduate students an opportunity to integrate classroom study with paid, career-related work experience for academic credit. Work may be full or part time. Credit is granted through Continuing Education and awarded directly by the Cooperative Education program. A cooperative education experience may substantially improve students' employment opportunities after graduation.

## Department of Accounting and Information Systems

[www.ndsu.nodak.edu/cba/departments/ais.html](http://www.ndsu.nodak.edu/cba/departments/ais.html)

### Accounting Major

Accounting is a profession that deals with providing financial information used in making business decisions. Financial accountants prepare financial statements used in making investing and lending decisions. Auditors examine financial statements and attest to their status. Management accountants evaluate and communicate internal financial information used by managers to operate a business. Forensic accountants specialize in the investigation and detection of, and protection against, fraud and abuse. Accountants also provide tax advisory

services to employer firms, clients, and governmental agencies. With their specialized knowledge concerning the internal operation of a business, many accountants provide management advisory services. Also, because of the specialized knowledge, many accountants advance into management positions.

Students majoring in Accounting are required to learn how to use computers in business and must take courses in many other aspects of business to understand how an accountant's work relates to marketing, management, finance, and production.

This four-year program leads to a Bachelor of Science degree with a major in Accounting. Completion of this program qualifies students to take the examinations required to become a Certified Management Accountant (CMA) and Certified Internal Auditor (CIA), and Certified Fraud Examiner (CFE).

### Accountancy Major

Accountancy involves a range of skills that includes collecting, measuring, interpreting, analyzing, and communicating financial activity. A major in Accountancy focuses on the development of such skills along with an understanding of the legal, social, and ethical responsibilities involved in the profession.

This five-year program leading to a Bachelor of Accountancy degree is specifically designed to prepare students for a career in public accounting. This program fulfills the requirement in North Dakota and other states for the Certified Public Accountant (CPA) examination.

### Recommended '06-07 Curricula Pre-Accounting Major<sup>1</sup>

	Credits	
	F	S
<b>First Year</b>		
COMM 110, Fund of Public Speaking . . . . .	--	3
CSCI 116, Busn Use of Computers . . . . .	4	--
ECON 201, 202, Prin of Micro, Macro . . . . .	3	3
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 146, Applied Calculus I . . . . .	--	4
UNIV 189, Skills for Academic Success . . . . .	1	--
Humanities & Fine Arts Elective . . . . .	3	3
Wellness . . . . .	2	--
Totals . . . . .	16	16

	<b>Credits</b>	
	<b>F</b>	<b>S</b>
<b>Second Year</b>		
ACCT 200, 201, Elem of Accounting I, II . . . . .	3	3
PSYC 111, Intro to Psychology . . . . .	--	3
PHIL/RELS 210, Ethics <b>or</b> PHIL 216, Business Ethics . . . . .	--	3
SOC 110, Intro to Sociology . . . . .	--	3
STAT 330, Intro Statistics . . . . .	3	--
STAT 331, Regression Analysis . . . . .	--	2
Cultural Diversity Elective . . . . .	--	3
Free Electives . . . . .	--	3
Science & Tech, Lab Elective . . . . .	4	2
Totals . . . . .	16	16

**Accounting Major<sup>1</sup>**

<b>Third Year</b>		
ACCT 311, 312, Intermediate Accounting I, II . . . . .	4	4
ACCT 320, Cost Management Systems . . . . .	--	3
ACCT 420, Acct Info Systems . . . . .	--	3
BUSN 350, Found of Management . . . . .	3	--
BUSN 360, Found of Marketing . . . . .	3	--
BUSN 430, Legal/Social Envir of Busn . . . . .	--	3
ECON 324, Money & Banking . . . . .	--	3
ENGL 320, Busn & Prof Writing <b>or</b> ENGL 358, Writing in the Humanities & Social Sciences . . . . .	3	--
MIS 370, Mgt Info Systems . . . . .	3	--
Totals . . . . .	16	16

**Accounting Practicum<sup>2</sup>** . . . . . 3 credits

<b>Fourth Year</b>		
ACCT 318, Taxation in Mgt Decisions . . . . .	3	--
ACCT 321, Govt/Not-for-Profit Acct . . . . .	3	--
ACCT 421, Auditing I . . . . .	3	--
ACCT 440, Mgt Control Systems . . . . .	--	3
BUSN 340, Prin of Finance . . . . .	3	--
BUSN 489, Strategic Mgt . . . . .	--	4
300-400 Accounting Elective <sup>3</sup> . . . . .	--	3
300-400 Business Electives . . . . .	3	3
Free Elective . . . . .	--	3
Totals . . . . .	15	16

**Four-Year Curriculum Total** . . . . . 130

**Accountancy Major<sup>1</sup>**

<b>Third Year</b>		
ACCT 311, 312, Intermediate Acct I, II . . . . .	4	4
ACCT 320, Cost Management Systems . . . . .	3	--
ACCT 420 Acct Info Systems . . . . .	3	--
BUSN 340, Principles of Finance . . . . .	--	3
BUSN 350, Found of Management . . . . .	3	--
BUSN 360, Found of Marketing . . . . .	3	--
BUSN 430, Legal/Social Envir of Busn . . . . .	--	3
ENGL 320, Business & Professional Writing <b>or</b> ENGL 358, Writing in the Humanities & Social Sciences . . . . .	--	3
MIS 370, Mgt Info Systems . . . . .	3	--
Totals . . . . .	16	16

<b>Fourth Year</b>		
ACCT 321, Gov/Not-for-Profit Acct . . . . .	3	--
ACCT 418, 419, Tax Accounting I, II . . . . .	3	3
ACCT 421, 422, Auditing I, II . . . . .	3	3
BUSN 352, Operations Mgt . . . . .	3	--
BUSN 431, Business Law I . . . . .	3	--
ECON 324, Money & Banking . . . . .	--	3
COMM 214, 216, 271, 308, <b>or</b> 315 . . . . .	3	--
300-400 Business Elective <sup>3</sup> . . . . .	--	3
Free Elective . . . . .	--	5
Totals . . . . .	18	17

	<b>Credits</b>
<b>Fifth Year</b>	
ACCT 415, Advanced Accounting . . . . .	3
BUSN 489, Strategic Management . . . . .	4
ENGL 320, 322, 323, 358, <b>or</b> 458 . . . . .	3
300-400 Level ACCT Elective <sup>2</sup> . . . . .	3
300-400 Level BUSN Elective <sup>3</sup> . . . . .	3
Total . . . . .	16
<b>Accounting Practicum<sup>2</sup></b> . . . . .	3 credits
<b>Five-Year Curriculum Minimum</b> . . . . .	150

1 Degree requirements are subject to change.  
2 Students must complete a practicum experience and should consult their academic advisors for further details.  
3 Students must consult with their academic advisors for the appropriate courses.

**Accounting Minor**

Students earning majors in other fields may select a minor in Accounting. A minor includes Elements of Accounting I and II (ACCT 200 and 201), Intermediate Accounting (ACCT 311) and Cost Management Systems (ACCT 380), plus six credits in approved accounting courses. In addition, students must earn a 2.50 cumulative grade-point average in the accounting courses to be awarded a minor. A minor approval form and fee are required. Completion of a minor in Accounting provides students with additional depth in accounting that many employers prefer.

**Fraud Investigation Minor**

Students in this interdisciplinary minor will study the causes of fraud, as well as the detection, investigation, and prevention of fraud. See Interdisciplinary Programs section for further information.

**Management Information Systems Major**

Management Information Systems concerns the collection, organization, analysis, and dissemination of information for the planning and control of business/organizational operations. The Management Information Systems (MIS) program is designed for students who wish to prepare for professional careers in information processing or information systems in business and government. The program is designed to develop technical skills and administrative insights required for design, development, implementation, maintenance, and management of organizational information systems.

The MIS program at NDSU is a collaborative effort by the faculty of two disciplines: Management Information Systems and Computer Science. The objective is to provide students with both theoretical knowledge and hands-on experience. In addition to the required courses in management information systems and computer science, majors must complete a practicum in the management information systems area. Students pursuing an MIS major typically earn a Computer Science minor.

The Bachelor of Science (B.S.) degree provides sufficient background and skills to support a successful career in technical computing (for example, programmer, systems analyst, or systems designer), systems or network administration, database administration, information technology management, sales, or technical sales support.

**Recommended '06-07 Curricula Pre-Management Information Systems Major<sup>1</sup>**

	<b>Credits</b>	
	<b>F</b>	<b>S</b>
<b>First Year</b>		
COMM 110, Fund of Public Speaking . . . . .	--	3
CSCI 116, Busn Use of Computers . . . . .	4	--
ECON 201, 202, Prin of Micro, Macro . . . . .	3	3
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 146, Applied Calculus I . . . . .	--	4
PSYC 111, Intro to Psychology . . . . .	3	--
UNIV 189, Skills for Academic Success . . . . .	1	--
Humanities & Fine Arts Elective . . . . .	3	--
Cultural Diversity Elective . . . . .	--	3
Totals . . . . .	17	16

<b>Second Year</b>		
ACCT 200, 201, Elem of Accounting I, II . . . . .	3	3
CSCI 227, 228, Comp Fund I, II . . . . .	3	3
PHIL/RELS 210, Ethics <b>or</b> PHIL 216, Business Ethics . . . . .	--	3
SOC 110, Intro to Sociology . . . . .	3	--
STAT 330, Intro to Statistics . . . . .	3	--
STAT 331, Regression Analysis . . . . .	--	2
Humanities & Fine Arts Elective . . . . .	--	3
Science & Technology Elective . . . . .	6	--
Wellness . . . . .	--	2
Totals . . . . .	18	16

**Management Information Systems Major<sup>1</sup>**

<b>Third Year</b>		
BUSN 340, Prin of Finance . . . . .	--	3
BUSN 350, Found of Management . . . . .	3	--
BUSN 352, Oper Mgt . . . . .	--	3
BUSN 360, Found of Marketing . . . . .	3	--
MIS 370, Mgt Info Systems . . . . .	3	--
MIS 376, Data & Telecom Admin . . . . .	--	3
2 <sup>nd</sup> Programming Language . . . . .	3	--
CSCI 315, Sys Analy & Design . . . . .	3	--
CSCI 316, Sys Testing & Main . . . . .	--	3
ENGL 320, Busn & Prof Writing <b>or</b> ENGL 358, Writing in the Humanities & Social Sciences . . . . .	--	3
Totals . . . . .	15	15

**Management Information Systems Practicum<sup>2</sup>** . . . . . 3 credits

<b>Fourth Year</b>		
BUSN 430, Legal/Social Envir of Busn . . . . .	3	--
MIS 375, Database Design . . . . .	3	--
MIS 470, Info Systems . . . . .	--	3
BUSN 489, Strategic Mgt . . . . .	4	--
Technology Elective I <sup>3</sup> . . . . .	3	--
CSCI 372, Comparative Languages . . . . .	--	3
CSCI 489, Soc Impl of Comp . . . . .	--	3
Technology Elective IP <sup>3</sup> . . . . .	3	--
300-400 Level BUSN Electives . . . . .	--	3
Free Elective . . . . .	--	2
Totals . . . . .	16	14
<b>Curriculum Total</b> . . . . .		130

1 Degree requirements are subject to change.  
2 Students must complete a practicum experience and should consult their academic advisors for further details.  
3 Contact department for approved electives.



## Management Information Systems Minor

The Management Information Systems minor is available only to Computer Science, Accounting, and Business Administration majors. It is intended for Accounting and Business Administration students who are planning careers that involve more active roles as user, evaluators, designers, and/or builders of information systems. For Computer Science students, the minor will give them exposure to issues relevant to the management of information technologies. This will provide them a better appreciation of how businesses view information systems as a means to achieve various organizational goals.

Contact the Department of Accounting and Information Systems for specific course and minimum grade point average requirements. A minor approval form and fee are required.

## Department of Management, Marketing, and Finance

[www.ndsu.edu/cba/departments/mmhf.homepage.shtml](http://www.ndsu.edu/cba/departments/mmhf.homepage.shtml)

### Business Administration Major

The Bachelor of Science degree with a major in Business Administration provides students with a broad base of knowledge in various functional areas of business (such as accounting, finance, management, and marketing). The program is structured to allow students to pursue one or more of the functional areas in greater depth. A thorough background in mathematics, statistics, computer science, and economics provides the student with the theory and analytical tools required for leadership in the modern business world.

The general education component of the major has been designed to develop basic skills, such as oral and written communication, as well as an understanding of people, culture, and natural phenomena.

To meet the changing needs in today's global environment, the Business Administration program emphasizes international coverage. International courses in finance, marketing, and management enable students to develop skills in understanding the global dimensions of decision-making.

The Business Administration major is flexible so that students may tailor their program to their particular interests such as finance, human resource management, or marketing. Students who wish to pursue international careers should consider a second major in International Studies or develop conversational skills in one or more foreign language.

Students completing the major in Business Administration find positions in banks, insurance companies, retail business, manufacturing, government service, and some manage their own business.

### Recommended '06-07 Curricula Pre-Business Administration Major

	Credits	
First Year	F	S
CSCI 116, Busn Use of Computers	4	--
ECON 201, Prin of Microeconomics	3	--
ECON 202, Prin of Macroeconomics	--	3
ENGL 110, 120, College Composition I, II	3	3
MATH 146, Applied Calculus I	--	4
SOC 110, Intro to Sociology	3	--
UNIV 189, Skills for Academic Success	1	--
Humanities & Fine Arts Elective	3	3
Wellness	--	2
Totals	17	15

	Credits	
Second Year	F	S
ACCT 200, 201, Elements of Acct I, II	3	3
PSYC 111, Intro to Psychology	3	--
PHIL/RELS 210, Ethics or PHIL 216, Business Ethics	3	--
COMM 110, Fund of Pub Speaking	--	3
STAT 330, Intro Statistics	3	--
STAT 331, Regression Analysis	--	2
Cultural Diversity Elective	--	3
Free Elective	3	--
Science & Technology Elective	2	4
Totals	17	15

### Business Administration Major<sup>1</sup>

Third Year	F	S
BUSN 340, Prin of Finance	3	--
BUSN 350, Found of Management	3	--
BUSN 351, Found of Org Behavior	--	3
BUSN 360, Found of Marketing	3	--
MIS 370, Mgr Info Systems	--	3
ECON 324, Money & Banking	--	3
ENGL 320, Business & Professional Writing <b>or</b> ENGL 358, Writing in the Humanities & Social Sciences	3	--
300-400 Level Finance Elective	--	3
300-400 Level Marketing elective	--	3
Free Electives	4	--
Totals	16	15

**Bus Admin Practicum<sup>2</sup> 3 credits**

Fourth Year	F	S
BUSN 352, Operations Mgt	3	--
BUSN 430, Legal/Social Environ of Busn	3	--
BUSN 451, Managerial Economics	4	--
BUSN 489, Strategic Mgt	--	4
300-400 Level Management Elective	--	3
Environment of Business (BUSN 310, 318, 431, 432, or 435)	3	--
Ind Elective (BUSN 310, 435, 445, 454, or 464) <sup>3</sup>	--	3
300-400 Level ACCT, BUSN, <b>or</b> MIS Electives <sup>4</sup>	3	6
Totals	16	16

**Curriculum Total. 130**

- 1 Degree requirements are subject to change.
- 2 Students must complete a practicum experience and should consult their academic advisor for further details.
- 3 The international elective may also satisfy one of the four specific area requirements, but cannot be double counted toward the 130 credits that are required for graduation.
- 4 No more than six credits in accounting or management information systems.

Students may choose one of the following concentrations in finance, marketing, human resource management, or electronic commerce. List of required courses for a concentration is available in the COB Student Service Center.

### Business Administration Minor

Majors outside the College of Business often select a minor in Business Administration. A minor includes ACCT 102 or ACCT 200 and 201; ECON 105 or ECON 201 and 202; two of the following: BUSN 340, 350, or 360; 12 credits of 300- or 400-level business administration courses, including MIS 370.

A minor in Business Administration requires a minimum of 24 credits. *At least 12 of the 18 credits in 300-400 level business administration courses (including MIS 370) must be completed at NDSU in the College of Business.* Any 300-400 level business administration courses (including MIS 370) that are

not completed at NDSU require prior departmental approval to be accepted for the minor. In addition, students must earn a 2.50 cumulative grade-point average based upon the courses used in the minor. A minor approval form and fee are required.

### Agribusiness (Corporate Track) Minor

The 21-credit Agribusiness minor with a corporate track is an alternate track to the Agribusiness minor in the Department of Agribusiness and Applied Economics. The minor supplements a student's technical training in agricultural sciences with an understanding of fundamental business concepts and applies business strategies to corporate agribusiness decision-making. The Agribusiness minor with a corporate track is restricted to students with a major in the College of Agriculture, Food Systems, and Natural Resources, excluding agricultural economics and agribusiness majors.

This minor includes ACCT 102, ECON 201, BUSN 340, 350, and 360 plus three credits at the 300-400 level in AGECE and three credits at the 300-400 level in BUSN.

### Logistics/Management Minor

The College of Business participates in the interdisciplinary minor in Logistics. Companies and the public increasingly rely on an effective and efficient logistics system to remain competitive. See Interdisciplinary Programs section for further information.

### Certificate Programs

Certificate programs in Finance, Human Resource Management, and Marketing provide an opportunity for individuals to enhance their knowledge base and become more productive in their professional careers. The programs focus on key concepts and tools that are consistent with current practice.

Prospective students are subject to the university's admission policies and procedures. Contact the COB Student Service Center for program requirements and policies.

### Graduate Program

The Master of Business Administration (MBA) is available. For more complete details, see The Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml)

# COLLEGE OF ENGINEERING AND ARCHITECTURE

[www.cea.ndsu.nodak.edu](http://www.cea.ndsu.nodak.edu)

Engineering Center 203 (701) 231-7494

Gary R. Smith, Dean

The vision for the College of Engineering and Architecture is to provide leadership in education and research in the fields of engineering and architecture and to achieve a national reputation in selected areas. The college also will enhance the economy, environment, and society of the region through the development, communication, and application of knowledge in engineering and architecture.

## Mission

The mission of the College of Engineering and Architecture is to provide outstanding education, research, and service to students, alumni, state residents, research partners, businesses, organizations, and government. Further, college faculty will provide leadership in economic development by transferring technology and by providing information and innovative design. College goals:

- Deliver quality undergraduate and graduate education by creating and utilizing effective instruction and by demonstrating commitment to each student's development.
- Encourage continuous learning among faculty, students, alumni, and the public.
- Develop distance education and continuing education for professionals seeking to upgrade skills.
- Provide laboratories and studios to facilitate quality education, research, and creativity.
- Foster research with an emphasis on engineering applications and creative design that most directly serves the region and influences the global community.
- Pursue niches of research opportunity and develop an industry/college learning center.
- Serve citizens, businesses, and industry in the region by providing professional expertise, outreach, and partnerships.

The departments include Agricultural and Biosystems Engineering, Architecture and Landscape Architecture, Civil Engineering, Construction Management and Engineering, Electrical and Computer Engineering, Industrial and Manufacturing Engineering, and Mechanical Engineering.

## Accreditation

The facilities and curricula of the college are inspected periodically by the Accreditation Board for Engineering and Technology, the National Architectural Accrediting Board, the American Council for Construction Education, and the Landscape Architecture Accreditation Board. These organizations are recognized national accrediting agencies for the engineering, architecture, landscape architecture, and construction management curricula.

## Admission Requirements

Applicants for admission must satisfy the general admission requirements of the university and the special requirements of the college and department.

### Recommended Preparation

Engineering programs encourage high school preparation in addition to the minimum core curriculum requirements. Prospective majors in engineering should present four units of high school mathematics including two units of algebra, one unit of geometry, and



one-half unit of trigonometry. Science courses should include one unit of physics and one unit of chemistry. Students whose high school credentials or entrance examinations show deficiencies in these subjects will be required to enroll in courses designed to remove such deficiencies and cannot expect to complete a program of study in the number of semesters indicated in the printed curricula.

## Selective Admission

Several programs within the College of Engineering and Architecture have selective admission. Refer to the department program descriptions below for respective selective admission criteria. Applicants should obtain information regarding the method of application from the NDSU Office of Admission.

## Degree Programs

Undergraduate programs of study lead to the Bachelor of Science degree in the specific fields of agricultural and biosystems engineering, civil engineering, computer engineering, construction engineering, construction management, electrical engineering, environmental design, industrial engineering and management, manufacturing engineering, and mechanical engineering. A five-year professional degree completes the programs in architecture and landscape architecture. Each of the curricula includes a number of options for specialized study.

The college has developed its programs of study to provide an educational experience in keeping with the professions of architecture, landscape architecture, and engineering. The classrooms, studios, and laboratories are well equipped and every effort is made to keep them abreast of current technology. Graduates successfully apply for registration as professional engineers or architects after minimum periods of professional experience. Examinations of the North Dakota State Board of Registration for Engineers and Architects are given

near campus each year. In addition, the Level I - Associate Constructor Certification Exam for American Institute of Constructors Certification Commission is offered each semester. All seniors are encouraged to take the examinations as soon as they are eligible.

All engineering departments have programs that lead to Master of Science and Doctor of Philosophy degrees. The Architecture department has a Master of Architecture degree. The graduate degrees are administered by The Graduate School and the College of Engineering and Architecture. A number of graduate assistantships are available to students undertaking graduate study. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

## Degree Requirements

To earn a baccalaureate degree from any of the engineering programs or the Construction Management program, a student must complete at least 60 semester credits of professional-level course work in his/her program while in residence and enrolled in the college. Students transferring into the college from programs with professional accreditation are exempt from the residence requirement, but are subject to NDSU's residence policy. Other exemptions must be approved by the college.

## Special Opportunities and Services

The college serves both students and the public. Special opportunities include the following:

### General Program

[www.ndsu.edu/ndsu/academic/factsbeets/eng\\_arch/](http://www.ndsu.edu/ndsu/academic/factsbeets/eng_arch/)  
The General program of the College of Engineering and Architecture is designed to allow students, who have not chosen the branch of engineering they wish to study, to take basic courses for one year. Students are encouraged to select an engineering curriculum as soon as possible, but no later than the end of their first year.

## Interdisciplinary Program Natural Resources Management

[www.ag.ndsu.nodak.edu/nrm](http://www.ag.ndsu.nodak.edu/nrm)

This multidisciplinary program is available through the College of Agriculture, Food Systems, and Natural Resources, the College of Engineering and Architecture, and the College of Science and Mathematics. Refer to the Interdisciplinary Programs section for further information.

## Student Societies and Organizations

All students are eligible to join one or more of these organizations which are actively supported for the benefit of students in the related curricula: American Indian Science and Engineering Society, American Institute of Architecture Students, American Society of Agricultural Engineers, American Society of Civil Engineers, American Society of Landscape Architects, American Society of Mechanical Engineers, American Water Works Association/Water Environmental Federation (AWWA/WEF) (one group), Associated General Contractors, Engineers Without Borders, Institute of Electrical and Electronic Engineers, Institute of Industrial Engineers, Institute of Transportation Engineers, Materials Research Society (MRS), National Association of Home Builders, Society for the Advancement of Material and Process Engineering (SAMPE), Society of Automotive Engineers, Society of Manufacturing Engineers, Society of Plastics Engineers, Inc. (SPE), Society of Women Engineers, and the Surface Mount Technology Association.

Air Force ROTC sponsors the Bernard S. Bennison Squadron of the Arnold Air Society (AAS). This is a non-profit student service organization dedicated to furthering the purpose, traditions and concepts of the United States Air Force. These objectives are primarily met through community service projects.

The Student Engineering and Architecture Council plans and administers many extracurricular student activities and is composed of elected representatives from the student societies.

Several national professional honor societies have chapters on the campus for which students with high academic attainments are eligible in their junior or senior years. Eligible students are selected for Tau Beta Pi from all engineering curricula, Tau Sigma Delta from architecture, Alpha Epsilon from agricultural and biosystems engineering, Eta Kappa Nu from electrical engineering, Alpha Pi Mu from industrial engineering, Sigma Lambda Alpha from landscape architecture, Sigma Lambda Chi from construction management and engineering, and Pi Tau Sigma from mechanical engineering. Membership in these societies is a coveted honor and highly regarded in the engineering and architectural professions.

## The Engineering and Architecture Experiment Station and Extension Service

Research and development projects are administered by an executive staff responsible for general policies, publications, and cooperative relations with private and governmental agencies.

### Executive Staff

Director, Gary R. Smith, PE  
Agricultural and Biosystems Engineering,  
Leslie Backer  
Architecture, Paul H. Gleye  
Civil Engineering, Dinesh Katti, PE  
Electrical and Computer Engineering,  
Daniel Ewert  
Industrial and Manufacturing Engineering,  
Kambiz Farahmand  
Mechanical Engineering, Alan Kallmeyer

Special research activities and projects of the college are coordinated through the Experiment Station. The professional services of faculty and the facilities of the college are available to both private and governmental agencies for research and development studies on engineering or architectural problems. Research projects of individual faculty members are sponsored and promoted by the station.

The Engineering Extension Service provides special educational project services to adult groups in conferences, workshops, short courses, and publications. The laboratory facilities of the college are available for specialized instruction under the supervision of faculty. Organizations planning educational programs or special projects for their members are invited to consult the service for assistance.

## Cooperative Education

Cooperative Education, a program of the Career Center, offers undergraduate and graduate students an opportunity to integrate classroom study with paid, career-related work experience for academic credit. Work may be full or part time. Credit is granted through Continuing Education and awarded directly by the Cooperative Education program. A Cooperative Education experience may substantially improve students' employment opportunities after graduation.

## Department of Aerospace Studies

### Aerospace Studies (Air Force ROTC)

[www.ndsu.edu/afrotc](http://www.ndsu.edu/afrotc)

The Air Force Reserve Officer's Training Corps (AFROTC) program is conducted by the Department of Aerospace Studies. The purpose of this program is to enable qualified undergraduate and graduate students to become commissioned officers in the United States Air Force.

AFROTC learning experiences will be of long-range value whether one pursues a military or civilian career. Upon graduation and completion of the AFROTC curriculum, each student is commissioned a second lieutenant in the United States Air Force.

The initial assignment options available to the Air Force second lieutenant include the following:

1. Enter the Air Force and complete the designated technical training course prerequisite to the student's specialty, i.e., flight training, research and development, management, or support functions.
2. Apply for a delay in entering active duty for the purpose of pursuing an advanced degree.
3. Enroll in one of several Air Force sponsored graduate study programs while serving with full pay as an Air Force officer.

The Aerospace Studies curriculum is divided into two courses of instruction: the General Military Course (GMC), which parallels the freshman and sophomore academic years, and the Professional Officer Course (POC), which parallels the junior and senior academic years. Students in the four-year program normally attend four weeks of field training at a designated Air Force base during the summer between their sophomore and junior years. The student who chooses not to enroll in the GMC (first two years) may still earn a commission by enrolling in a special two-year program during the junior and senior years. Admission to this special program requires the student to make application early in the sophomore year. Qualified students will then participate in a six-week field-training program at an Air Force base the summer prior to their junior or senior year.

AFROTC college scholarships are awarded to the best-qualified students and range in length from one to four years. These grants cover the cadet's tuition, incidental lab fees and most textbooks. In addition, cadets receive a tiered monthly allowance. For example, cadets enrolled in the Professional Officer Corps (POC) receive \$350 per month during their junior academic year and \$400 per month during their senior academic year. Incentive scholarships also are available for students not already on scholarship.

Upon entering the Air Force, students who are selected to the pilot program will receive 48 weeks of pilot training.

## Recommended '06-07 Curriculum Aerospace Studies Minor

Satisfactory completion of the four-year AFROTC program, 24 credits, constitutes a minor in Aerospace Studies.

For detailed information on the Air Force ROTC program, contact the Department of Aerospace Studies at 231-8186, 101 Benson/Bunker Fieldhouse or visit our website.

### General Military Course

AS 110, Air Force Fitness . . . . .	1
AS 111, Air Force Today I . . . . .	1
AS 112, Air Force Today II . . . . .	1
AS 210, Leadership Lab (each sem.) . . . . .	1
AS 211, Air and Space Power I . . . . .	1
AS 212, Air and Space Power II . . . . .	1

### Credits

### Professional Officer Course

AS 110, Air Force Fitness . . . . .	1
AS 321, AF Leadership Mgmt I . . . . .	3
AS 322, AF Leadership Mgmt II . . . . .	3
AS 410, Leadership Lab (each sem.) . . . . .	1
AS 441, Prep for Active Duty I . . . . .	3
AS 442, Prep for Active Duty II . . . . .	3

## Department of Agricultural and Biosystems Engineering

[www.ageng.ndsu.edu/](http://www.ageng.ndsu.edu/)

### Agricultural and Biosystems Engineering Major

Agricultural and Biosystems Engineering (ABEN) is the application of mathematics, physical, chemical, and biological science and engineering to natural resources and environment, agriculture, food processing, and related biological systems. The Agricultural and Biosystems Engineering curriculum is designed to educate men and women for careers that provide the opportunity for them to devise practical and efficient solutions for producing, storing, transporting, and packaging agricultural product. They learn to solve problems related to systems, processes and machines that interact with humans, plants, animals, microorganisms, and biological materials. They learn to develop solutions for responsible, alternative uses of agricultural products, byproducts and wastes, and our natural resources—soil, water, air, and energy. The program specializes in agricultural systems, environmental systems, and biomaterials systems. Typical careers include the design, test, and manufacture of systems for mechanized and automated agricultural production and processing systems, systems for food and renewable products processing and systems for the storage of agricultural and other biological materials, systems for plant, animal, and energy production, and natural resource management to maintain and improve environmental quality.

The educational objectives of this major are to provide students with: a) technical knowledge and design and problem solving skills that are foundational to their engineering careers, b) provide learning experiences that build interpersonal and collaborative skills and the capacity for productive careers, and c) provide students with disciplinary knowledge, educational depth and breadth to deal with changing career opportunities in agriculture and closely related biological industries. These objectives support the departmental mission of developing and extending knowledge through engineering and technology that advances the productivity of agricultural production, the processing and utilization of agricultural commodities and related biological materials, and the sustainment of environmental resources management.

The curriculum is based on a core of engineering sciences, mathematics, and basic sciences. By selecting appropriate electives, students may emphasize areas such as agricultural systems, environmental systems, biomaterials and food processing systems, or an emphasis area designed by the student and his or her advisor.

**Agricultural Systems Emphasis:** This emphasis is focused on courses in machinery, power, structural, electronic and sensor systems to prepare students for positions related to engineering for improved food, feed, and fiber production.

**Biomaterials Emphasis:** With this emphasis, students prepare for engineering positions in the rapidly expanding industries that handle and process biomaterials for food and non-food products and that create new applications of sciences in biotechnical, biore-source, and bioenvironmental fields.

**Environmental Systems Emphasis:** This emphasis is focused on the preparation of students for positions in environmental engineering, natural resources management, irrigation engineering, watershed management, and waste management.

**Electives:** Elective opportunities also are available in information and electronic systems and computer aided design. Students select elective courses with the individualized assistance of faculty advisors.

The faculty also assists with career development and job placement of graduates. Students interested in careers involving delivery, management, and technical support of systems for food, agricultural, or closely related industries rather than engineering or design should consider the Agricultural Systems Management major offered by the College of Agriculture, Food Systems, and Natural Resources.

## Recommended '06-07 Curriculum Agricultural and Biosystems Engineering Major

	Credits	
	F	S
<b>First Year</b>		
ABEN 110, Intro to Ag & Biosys Engr . . . . .	2	--
ABEN 189, Skills for Academic Success . . . . .	1	--
CHEM 121, 122, General Chemistry I, II . . . . .	3	3
ENGL 110, 120, College Comp I, II . . . . .	3	3
MATH 165, 166, Calculus I, II . . . . .	4	4
Humanities/Fine Arts Elective . . . . .	3	--
ABEN 496, Field Experience . . . . .	--	1
ME 212, Fund of Visual Communications . . . . .	--	3
ME 221, Engineering Mechanics I . . . . .	--	3
Totals . . . . .	16	17

	Credits	
	F	S
<b>Second Year</b>		
ABEN 255, Comp Aided Anal & Design . . . . .	3	--
ABEN 263, Biomaterials Processing . . . . .	--	3
BIOL 150, General Biology I . . . . .	3	--
CE 309, Fluid Mechanics . . . . .	3	--
MATH 128, Intro to Linear Algebra . . . . .	1	3
MATH 259, Multivariate Calc. . . . .	3	--
MATH 266, Differential Equations . . . . .	--	3
ME 222, Engr Mech II . . . . .	3	--
ME 223, Mech of Materials . . . . .	3	--
PHYS 252, 252L, Univ Physics II, Lab . . . . .	--	4,1
CSCI Programming Elective . . . . .	--	3
Totals . . . . .	16	17

<b>Third Year</b>		
ABEN 377, Modeling in ABEN . . . . .	--	3
CE 310, Fluid Mechanics Lab . . . . .	1	--
ECE 301, Electrical Engineering I . . . . .	3	--
ME 350, Thermodynamics/Heat Transfer . . . . .	3	3
COMM 110, Fund of Public Speaking . . . . .	3	--
ABEN Electives . . . . .	3	3
IME 440, Engineering Economy . . . . .	2	--
Biological Science Elective . . . . .	3	--
Social/Behavioral Sciences Elective . . . . .	--	3
Statistics Elective . . . . .	3	--
Technical Electives . . . . .	--	6
Totals . . . . .	18	18

<b>Fourth Year</b>		
ABEN 482, Instrument & Measure . . . . .	--	3
ABEN 486, 487, Design Proj I, II . . . . .	1	2
ABEN 491, Seminar . . . . .	1	--
ENGR 402, Engr Ethics/Social Resp . . . . .	--	1
ABEN Elective . . . . .	3	3
Technical Electives . . . . .	6	--
Biological Science Elective . . . . .	3	--
Humanities/Fine Arts Elective . . . . .	--	3
Social/Behavioral Sciences Elective . . . . .	3	--
Business/Communication Elective . . . . .	--	3
Wellness . . . . .	--	2
Totals . . . . .	17	17

**Curriculum Total . . . . . 136**

### Agricultural and Biosystems Engineering Electives:

ABEN 358 - 3, Electrical Energy Applications in Ag	3
ABEN 452 - 3, Bioenvironmental Systems Design	3
ABEN 458 - 3, Food Process Engineering	3
ABEN 464 - 4, Resource Conservation & Irrigation Engineering	4
ABEN 473 - 3, Agricultural Power	3
ABEN 478 - 2, Machinery Analysis & Design	2

### Technical Electives:

Students consult their advisor for approved courses according to their career interests and/or a selected emphasis area.

**Agricultural Systems:** Engineering for advancing productivity of food, feed, and fiber production; emphases may include power and machinery systems, machine design, manufacturing, structures and environment control, computer aided design, electrical and electronic systems, and instrumentation and measurements.

**Biomaterials Systems:** Engineering for quality maintenance, new uses, or enhanced utilization of agricultural and related biological materials; emphases may include engineering properties of biological materials, biological materials processing, food process engineering, waste management, and bioprocessing.

**Environmental Systems:** Engineering for responsible use and sustainable management of environmental resources; emphases may include hydrology, soil and

water resource conservation, irrigation engineering, water and wastewater engineering, and water quality management.

## Department of Architecture and Landscape Architecture

[www.ndsu.nodak.edu/arch](http://www.ndsu.nodak.edu/arch)

### Architecture Major

The architect must combine an understanding of society, artistic skill, and technological knowledge to shape places and spaces that enrich human life. Not only do the physical workday requirements need to be satisfied, but also there must be beauty to house the human spirit. All of this requires a creative thought process that can balance and organize needs that are quite varied in nature. Clear, responsible, sensitive, and comprehensive thinking is demanded of the architect who is to integrate a wide range of factors into a design that is meaningful. For this reason an architect's education must range from the practical aspects of building construction to the study of environmental, social, and visual effects.

Central to the study of architecture is the sequence of architectural studio courses. Students are assigned or select architectural problems, which may be hypothetical, realistic, or theoretical, and find their own solutions to them with frequent individual consultations with instructors. As the student progresses, the projects become larger and more complex or the solution becomes more detailed. In this way, knowledge and experience acquired in other classes are brought to bear on the principal responsibility of the architect and the architecture student, that of shaping separate considerations into a single design.

### Selective Admission

Selective admission into the Architecture program at NDSU takes place through a two-step process. Step one: High school students entering as freshmen are evaluated on the basis of their high school record and test scores, while transfer students are evaluated on the basis of courses taken and grades received. Step two: Upon completion of the first year, a selected number of students are admitted to the second year of the program on the basis of institutional GPA attained and performance in first-year architecture courses.

### The Program

A four-year undergraduate curriculum leads to the pre-professional Bachelor of Science in Environmental Design degree, followed by a one-year graduate program leading to the Master of Architecture degree as the professional degree in architecture. The program is fully accredited by the National Architectural Accrediting Board, and the M.Arch. degree is recognized by the National Council of Architectural Registration Boards as a professional degree.

The total number of credits required for the professional degree is 170 and the four-year degree requirement is 132.

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture. A program may be granted a 6-year, 3-year, or 2-year term of accreditation, depending on the extent of its conformance with established educational standards.

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

### Special Notice

Students who are admitted into the second year of the program will be required to purchase a laptop computer. Information on type of computer, software, purchase, and financing arrangements will be distributed to admitted students prior to purchase.

### Recommended '06-07 Curriculum Master of Architecture

		Credits	
First Year	F	S	
ANTH 111, Intro to Anthropology	3	--	
PHYS 120, Intro to Physics	3	--	
ENVD 172, Environmental Design Fund	4	--	
ENVD 130, Draw for Environmental Designers	3	--	
COMM 110, Fund Public Speaking	3	--	
ENGL 110, 120, College Composition I, II	3	3	
ENVD 101, Intro to Environmental Design	3	--	
SOC 110, Intro to Sociology	3	--	
Quantitative Reasoning	3	--	
Wellness	2	--	
UNIV 189, Skills for Academic Success	1	--	
Totals	16	18	

#### Second Year

MATH 105, Trigonometry	3	--	
ARCH 231, Arch Drawing	3	--	
ARCH 232, Design Technology	2	--	
ARCH 271, 272, Arch Design I, II	6	6	
ARCH 321, 322, History of Arch I, II	3	3	
ARCH 326, Design Theory	3	--	
Science and Lab	3/1	3/1	
PSYC 111, Intro to Psychology	3	--	
Totals	18	18	

#### Third Year

ARCH 344, Arch Structures I	3	--	
ARCH 351, Materials & Const	4	--	
ARCH 354, Arch Detailing	3	--	
ARCH 371, 372, Arch Design III, IV	6	6	
ARCH 461, Urban Design	2	--	
LA 341, Site Dev & Det I	4	--	
Science and Technology Elective	3	--	
Humanities Elective	3	--	
Totals	17	17	

#### Fourth Year

ARCH 443, Arch Structures II	3	--	
ARCH 453, ECS: Passive Prin	3	--	
ARCH 454, ECS: Active Systems	3	--	
ARCH 471, 472, Arch Design V, VI	6	6	
ARCH 721-728, Hist/Theory Topics	2	--	
Humanities & General Electives	3	6	
Totals	17	17	

#### Fifth Year

ARCH 663, Thesis Preparation	3	--	
ARCH 681, Prof Practice	3	--	
ARCH 771, Advanced Arch Design	6	--	
ARCH 772, Design Thesis	8	--	
ARCH 789, Prof Topics	3	3	
Electives	3	3	
Totals	18	14	

**Curriculum Total. . . . . 170**

**Note:** Electives must include six credits of humanities, six credits of science plus a one-credit lab, and nine credits at the 300-level and above. Students must meet the university general education requirements as well as the curriculum requirements in effect at the time of

entrance into the program. Two department approved humanities courses are required above and beyond general education.

### Recommended '06-07 Curriculum B.S. in Environmental Design

		Credits	
First Year	F	S	
ANTH 111, Intro to Anthropology	3	--	
PHYS 120, Intro to Physics	3	--	
ENVD 172, Environmental Design Fund	4	--	
ENVD 130, Draw for Environmental Designers	3	--	
COMM 110, Fund Public Speaking	3	--	
ENGL 110, 120, College Composition I, II	3	3	
ENVD 101, Intro to Environmental Design	3	--	
SOC 110, Intro to Sociology	3	--	
Quantitative Reasoning	3	--	
Wellness	2	--	
UNIV 189, Skills for Academic Success	1	--	
Totals	16	18	

#### Second Year

MATH 105, Trigonometry	3	--	
ARCH 231, Arch Drawing	3	--	
ARCH 232, Design Technology	2	--	
ARCH 271, 272, Arch Design I, II	6	6	
ARCH 321, 322, History of Arch I, II	3	3	
ARCH 326, Design Theory	3	--	
Science & Lab	3/1	3/1	
PSYC 111, Intro to Psychology	3	--	
Totals	18	18	

#### Third Year

ARCH 344, Arch Structures I	3	--	
ARCH 351, Materials & Const	4	--	
ARCH 354, Arch Detailing	3	--	
ARCH 371, 372, Arch Design III, IV	6	6	
ARCH 461, Urban Design	2	--	
LA 341, Site Dev & Det I	4	--	
Science & Technology Elective	3	--	
Humanities Elective	3	--	
Totals	17	17	

#### Fourth Year

ARCH 443, Arch Structures II	3	--	
ARCH 453, ECS: Passive Prin	3	--	
ARCH 454, ECS: Active Systems	3	--	
ARCH 471, 472, Arch Design V, VI	6	6	
Humanities Elective	3	--	
General Electives	3	1	
Totals	15	13	

**Curriculum Total. . . . . 132**

**Note:** Electives must include six credits of humanities, six credits of science plus a one-credit lab, and three credits at the 300-level and above. Students must meet the university general education requirements as well as the curriculum requirements in effect at the time of entrance into the program. Two department approved humanities courses are required above and beyond general education.

### Landscape Architecture Major

The Landscape Architecture program is one of approximately 74 accredited programs in the United States and Canada. The curriculum is reviewed periodically by the nationally organized Landscape Architecture Accreditation Board and has been fully accredited since 1991.

Landscape architects provide a wide variety of professional services for individual clients, organizations, corporations, and government agencies. They are involved at every phase of the development of a site, from the initial discussion of ideas with the client through the supervision of construction for the project.

Master planning of parks, zoos, golf courses, playgrounds, and recreation areas are familiar projects for landscape architects. They may also design multi-

functional areas for urban renewal projects, college campuses, industrial parks, new communities, natural areas, reclaimed lands, and wetlands.

Besides designing sites, landscape architects often select building locations, prepare cost estimates, initiate long-range planning studies, determine utility corridors, and prepare environmental impact statements for future construction. Whether specializing within a large firm of landscape architects or working in a small professional office, the landscape architect is often collaborating with other professionals, such as engineers, city-planners, and other architects.

Most landscape architects spend some of their time at the drawing board or computer. They also spend many hours in the field, investigating and analyzing potential project sites, developing field notes for design layouts, completing visual surveys, and supervising construction. It is at the computer and drawing board that projects are actually organized and shaped into a creative and imaginative solution. The work and responsibility of each landscape architect depends principally on individual interests and abilities. Opportunities may range from professional practice on a small scale to administration of governmental programs.

Those who plan careers in landscape architecture should be able to work independently, have a capacity for solving technical problems, be artistically inclined, and willing to learn computer use. They should be prepared to work in the competitive environment of the profession, where great value is placed on leadership and the ability to work effectively with others. The range of interests and knowledge required in the profession of landscape architecture is broad; therefore, the courses required of students include many fields of study options. A student may specialize by selecting one of the options provided: Land Reclamation/Natural Resources Management, Landscape Construction and Technology, Rural Community Development, or Design and Communication. Students may also tailor their own option area with their academic advisor.

### Selective Admission

Selective admission in the Landscape Architecture program at NDSU takes place through a two-step process. Step one: High school students entering as freshmen are evaluated on the basis of their high school record and test scores, while transfer students are evaluated on the basis of courses taken and grades received. Step two: Upon completion of the first year, a selected number of students are admitted to the second year of the program. The basis for selection is institutional GPA and performance in first-year landscape architecture courses.

### Special Notice

Students in the second year of the program will be required to purchase a laptop computer. Information on type of computer, software, purchase, and financing arrangements will be distributed to students prior to purchase.

### Recommended '06-07 Curriculum Landscape Architecture Major

		Credits	
First Year	F	S	
ANTH 111, Intro to Anthropology	3	--	
ENVD 130, Draw for Environmental Designers	3	--	
COMM 110, Fund of Public Speaking	3	--	
CSCI 114, Microcomp Packages	3	--	
ENGL 110, 120, College Composition I, II	3	3	
LA 132, Intro to Landscape Arch	2	--	
ENVD 101, Intro to Environmental Design	3	--	
ENVD 172, Environmental Design Fund	4	--	
MATH 104 or 146, Fin Math or App Calc I	3	--	
UNIV 189, Skills for Academic Success	1	--	
Wellness	2	--	
Totals	16	17	

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Second Year</b>		
BIOL 150, General Biology I . . . . .	3	--
LA 242, Elements of Surveying . . . . .	--	2
ENGL 320, Practical Writing . . . . .	--	3
GEOL 105, 105L, Phys Geol I, Lab . . . . .	3,1	--
ARCH 231, Arch Drawing . . . . .	--	3
ARCH 232, Design Technology . . . . .	--	2
LA 271, 272, Landscape Arch I, II . . . . .	4	4
LA 351, Landscape Design . . . . .	3	--
PSYC 111 or SOC 110, Intro to Psychology <b>or</b>		
Intro to Sociology . . . . .	--	3
Computer Science Elective . . . . .	--	3
Totals . . . . .	17	17

<b>Third Year</b>		
ARCH 321, History of Arch I . . . . .	3	--
ARCH 461, Urban Design . . . . .	--	2
LA 322, History of Landscape Arch . . . . .	--	4
LA 341, 342, 344, Site Dev & Det I, II, Lab . . . . .	4	3,2
LA 371, 372, Landscape Arch III, IV . . . . .	4	4
PLSC 355, Woody Plants . . . . .	3	--
Elective/Option Area . . . . .	2	1
Totals . . . . .	16	16

<b>Fourth Year</b>		
LA 441, Site Dev & Det III . . . . .	3	--
LA 471, 472, Adv LA I, II . . . . .	6	6
LA 491, Contemp Issues . . . . .	--	2
LA 552, Adv Landscape Planning . . . . .	--	2
Electives/Option Area . . . . .	5	5
Totals . . . . .	14	15

<b>Fifth Year</b>		
LA 531, Adv Landscape Arch Planting Design . . . . .	4	--
LA 581, Prof Practice . . . . .	2	--
LA 563, Landscape Arch Programming . . . . .	2	--
LA 571, Adv Landscape Arch Design III . . . . .	6	--
LA 572, Design Thesis . . . . .	8	--
LA 590, Prof Seminar . . . . .	2	2
Elective/Option Area . . . . .	--	6
Totals . . . . .	16	16

**Curriculum Total . . . . . 160**

## Department of Civil Engineering

[www.ce.ndsu.nodak.edu](http://www.ce.ndsu.nodak.edu)

### Civil Engineering Division

The mission of the Civil Engineering department is to provide quality education to prepare nationally competitive undergraduate students for a successful career in civil engineering; to provide advanced skills and knowledge in state-of-the-art research and design in sub-areas of civil engineering for graduate students; and to provide service to the university, engineering profession, and the public. The departmental objectives are to provide students with:

1. technical knowledge, design capability, and problem solving skills fundamental to a career in civil engineering,
2. knowledge and skills necessary for comparative evaluation of design alternatives,
3. necessary communication skills to successfully practice the civil engineering profession, and
4. awareness of the need for professionalism, teamwork, life-long learning, and understanding the broader societal implications of civil engineering projects.

Civil engineering includes the planning, design, construction, maintenance, and operation of large and permanent engineering projects of our civilization. Civil engineers are in demand wherever there are

people. The major subdivisions of civil engineering are structural, geotechnical, environmental, sanitary, water resources, and transportation engineering.

The civil engineer is responsible for such projects as bridges and large buildings, dams, and other river and harbor work, municipal water supply and sanitation facilities, streets, highways, and other transportation facilities. On many projects, civil engineers work in close cooperation with engineers and scientists from other fields.

The Civil Engineering program at NDSU is accredited by the Engineering Accrediting Commission of the Accreditation Board for Engineering and Technology (ABET).

### Civil Engineering Major

The Civil Engineering curriculum is designed to give students a thorough mathematical and scientific background in all of the subdivisions of the field. At the same time it provides students with an opportunity to place further emphasis on his/her chosen subdivision through technical electives.

Twelve credits of the curriculum are available for technical electives. Students are required to choose three technical electives from the five major areas, while at the same time satisfying the ABET design requirement. All Civil Engineering students must take a capstone design course, CE 489, which is designed to bring concepts learned in different courses to culminate in a major design experience.

Students interested in structural engineering may choose courses like frame analysis, finite element analysis, advanced reinforced concrete, advanced steel design, timber design, plastic design in steel, prestressed concrete, foundation engineering, structural mechanics, and dynamics of structures.

Students interested in water resources, sanitary, or environmental engineering may choose courses like solid waste management, applied hydraulics and hydrology, ground water and seepage, water and wastewater laboratory practices, properties of open channels, air pollution, hazardous waste management, water quality management, and sanitary engineering problems.

Students interested in transportation engineering may choose courses like transportation planning, airport planning and design, railway planning and design, geometric highway design, or traffic engineering and pavement design.

Students interested in geotechnical engineering may choose courses in foundation engineering, earth slopes, and geosynthetics.

The curriculum includes a core of social humanistic subjects to provide the student with a background essential to a proper understanding of the role of engineering in society.

Students in Civil Engineering are strongly encouraged to participate in the Cooperative Education program to enhance their classroom education with practical experience in engineering-related positions in industry.

Students transferring into Civil Engineering from other departments or institutions are encouraged to do so no later than the beginning of the junior year if they wish to complete the degree requirements within two academic years.

Graduate programs leading to Master of Science and Doctor of Philosophy degrees are available in specialized fields. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

### Recommended '06-07 Curriculum Civil Engineering Major

All Civil Engineering students at NDSU are required to have a minimum institutional grade-point average of 2.0 and to have received a grade of C or better in Math 165, 166, 128, 259, 266, ME 221, 222, 223, before enrolling in CE 309, 316, 343, and 418.

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
CE 111, Intro Civil Engr . . . . .	--	2
CHEM 121, 121L, 122, 122L		
General Chemistry I, II, Labs . . . . .	3,1	3,1
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 165, 166, Calculus I, II . . . . .	4	4
ME 221, Engr Mechanics I . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
General Education Elective . . . . .	3	--
Totals . . . . .	15	16

<b>Second Year</b>		
CE 204, Surveying . . . . .	4	--
COMM 110, Fund of Public Speaking . . . . .	--	3
GEOL 105, Physical Geology . . . . .	3	--
IME 460, Evaluation of Engr Data . . . . .	--	3
MATH 128, 259, Intro Linear Algebra		
Multivariate Calculus . . . . .	1,3	--
MATH 266, Diff Equations . . . . .	--	3
ME 212, Fund of Visual Communication . . . . .	3	--
ME 222, Engr Mechanics II . . . . .	3	--
ME 223, Mech of Materials . . . . .	--	3
PHYS 252, University Physics II . . . . .	--	4
Totals . . . . .	17	16

<b>Third Year</b>		
CE 303, Civil Engr Materials . . . . .	--	3
CE 309, Fluid Mechanics . . . . .	3	--
CE 316, Soil Mechanics . . . . .	3	--
CE 343, Structural Analysis . . . . .	--	4
CE 370, Intro Environmental Engr . . . . .	--	3
CE 371, Environmental Engr Lab . . . . .	--	1
CE 408, Water Resources & Supply . . . . .	--	3
CE 418, Transportation Engr . . . . .	--	4
ENGR 311, Impact of Tech I . . . . .	3	--
ENGR 402, Engr Ethics & Soc Resp . . . . .	1	--
ME 350, Therm/Heat Transfer . . . . .	3	--
Wellness . . . . .	2	--
Totals . . . . .	15	18

<b>Fourth Year</b>		
CE 310, Fluid Mechanics Lab . . . . .	1	--
CE 404, Reinforced Concrete . . . . .	3	--
CE 444, Structural Steel Design . . . . .	3	--
CE 483, Contracts & Specs . . . . .	--	3
CE 489, Senior Design . . . . .	--	2
ENGR 312, Impact of Tech II . . . . .	3	--
IME 440, Engr Economy . . . . .	--	2
General Education Electives . . . . .	3	--
Technical Electives . . . . .	4	8
Totals . . . . .	17	15

**Curriculum Total . . . . . 129**

#### Technical Electives

	<i>Credits</i>
<b>Fall</b>	
CE 410,610 Water & Wastewater Engr . . . . .	3
CE 441,641 Finite Element Analysis . . . . .	2
CE 446,646 Dynamics of Structures . . . . .	3
CE 454,654 Geometric Highway Design . . . . .	3
CE 455,655 Airport Planning & Design . . . . .	2
CE 456,656 Railroad Planning & Engr . . . . .	2
CE 461,661 Foundation Engineering . . . . .	2
CE 472,672 Solid Waste Management . . . . .	3
CE 477,677 Applied Hydrology . . . . .	3
CE 478,408 Water Quality Management . . . . .	3
CE 720, Continuum Mechanics . . . . .	3

<b>Spring</b>	<b>Credits</b>
CE 411,611 Prestressed Concrete.....	2
CE 417,617 Earth Slopes.....	2
CE 419,619 Pavement Design.....	3
CE 421,621 Open Channels.....	3
CE 430,630 Timber Design.....	3
CE 445,645 Advanced Steel Design.....	2
CE 462,662 Designing w/Geosynthetics.....	2
CE 473,673 Air Pollution.....	3
CE 479,679 Adv Water/Wastewater Treat.....	3
CE 770, Haz Waste Site Remediation.....	3
CE 772, Rural Logistics & Distribution.....	3
CE 774, Transport Corridor Planning.....	3
CE 775, Industrial Waste Management.....	3
CE 776, Ground Water & Seepage.....	3
CE 781, Traffic Engineering.....	3
CE 778, Transportation Administration.....	3

**Note:** Department permission required for graduate level courses. Registration must be processed at 110 Ceres Hall. Credit may only be earned at the undergraduate level.

## Department of Construction Management and Engineering

[www.cme.ndsu.nodak.edu/index.html](http://www.cme.ndsu.nodak.edu/index.html)

The mission of the Department of Construction Management and Engineering at North Dakota State University is to provide quality programs for preparing nationally competitive undergraduate and graduate students for a successful career in construction. The programs are designed to provide education, research, and outreach opportunities that serve both the needs of students and those of the construction industry. The educational objectives of the programs are to provide students with: (a) basic skills necessary to plan, organize, and control resources to manage the overall construction process, (b) technical knowledge, design, and problem solving skills for a career in construction, (c) knowledge and skills necessary to identify, define, and compare design alternatives, (d) necessary communication skills for successful practice of the construction profession, and (e) opportunities to learn the need for professionalism and life-long learning, and the need to understand the broader societal implications of construction projects.

The continued rapid growth of the construction industry demands new kinds of professionals, the construction engineer, and manager. These professional constructors will be required to integrate new and high-level technology into all aspects of the design and construction process. All the aspects that contribute to the finished construction project from the initial planning stage through the final project turnover require close and careful attention. An individual with management and technical ability to oversee an entire project is essential to the industry. To fill the need for qualified professionals, Bachelor of Science degree programs in Construction Management and Construction Engineering are offered.

The construction programs are very practical in nature and are designed to prepare the graduate for entry into the construction industry on a professional level. Construction graduates build homes, highways, bridges, power plants, dams, tunnels, skyscrapers, and many other facilities of benefit to society.

### Construction Engineering Major

The Construction Engineering program is a blend of engineering, construction, and construction management courses. This program is designed for those who want to work in the construction industry and enjoy

the status of a professional engineer. It is somewhat similar to the Construction Management program, but has more emphasis on engineering and technical courses. The Construction Engineering program is accredited by the Accreditation Board for Engineering and Technology.

### Recommended '06-07 Curriculum Construction Engineering Major

	<b>Credits</b>	
<b>First Year</b>	<b>F</b>	<b>S</b>
CHEM 121, 121L, General Chemistry I, Lab . . .	3,1	--
CM&E 111, Intro to CM&E . . . . .	--	1
ECON Elective . . . . .	3	--
ENGL 110, 120, College Composition I,II . . . .	3	3
MATH 165, 166, Calculus I . . . . .	4	4
CME 212, Fund of Visual Communication . . . .	3	3
ME 221, Engr Mech I . . . . .	--	3
CHEM 122, General Chemistry II . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Totals . . . . .	16	16

#### Second Year

CE 204, Surveying . . . . .	4	--
CM&E 385, Const Safety . . . . .	--	2
COMM 110, Fund of Public Speaking . . . . .	--	3
GEOL 105, Physical Geology . . . . .	3	--
MATH 128/259, Intro to Linear . . . . .	1,3	3
MATH 266, Intro to Diff Equations . . . . .	--	3
ME 222, Engr Mechanics II . . . . .	3	--
ME 223, Mechanics of Materials . . . . .	--	3
PHYS 252, Univ Physics II . . . . .	--	4
Humanities/Diversity Elective . . . . .	3	--
Wellness . . . . .	--	2
Totals . . . . .	17	17

#### Third Year

CE 303, Civil Engr Materials . . . . .	--	3
CE 309, Fluid Mechanics . . . . .	3	--
CE 316, Soil Mechanics . . . . .	3	--
CE 343, Structural Analysis . . . . .	4	--
CM&E 301, Const Tech & Equip . . . . .	--	4
Soc/Behavioral Elective . . . . .	--	3
CM&E 315, Specs & Contracts . . . . .	3	--
CM&E 370, Intro to Cost Estimating . . . . .	2	--
CM&E 411, Const Cost Estimating . . . . .	2	--
IME 440, Engr Economy . . . . .	2	--
STAT 330, Intro to Statistics . . . . .	3	--
Totals . . . . .	16	16

#### Fourth Year

CE 404, Reinforced Concrete . . . . .	3	--
CE 430, Timber & Form Design . . . . .	3	3
CE 444, Structural Steel Design . . . . .	3	--
CM&E 403, Sched & Proj Control . . . . .	4	--
CM&E 419, Pavement Design . . . . .	3	--
CM&E 412, Construction Management . . . . .	3	--
CM&E 489, Construction Design . . . . .	3	--
ECE 301, Electrical Engr I . . . . .	3	--
Humanities Elective . . . . .	3	--
ENGR 402, Engr Ethics & Soc Resp . . . . .	1	--
Technical Elective . . . . .	--	2
Totals . . . . .	16	15

**Curriculum Total . . . . . 129**

### Construction Management Major

Construction management is a combination of engineering technology, construction techniques, and management to meet the needs of the rapidly growing construction industry. The program is designed to prepare students for the art of achieving maximum profit by efficient use of people, machines, materials, and money to complete a construction project on time and to the satisfaction of the owner.

A meld of engineering, construction, management, and business gives the student a background and understanding of management's point of view in the

construction industry. The Construction Management program is accredited by the American Council for Construction Education.

Junior and senior Construction Management majors must maintain a minimum 2.50 institutional grade-point average to be eligible for enrollment in 300-400 level courses offered by the College of Business Administration.

### Recommended '06-07 Curriculum Construction Management Major

	<b>Credits</b>	
<b>First Year</b>	<b>F</b>	<b>S</b>
CHEM 121, 121L, General Chemistry I, Lab . . .	3,1	--
CM&E 111, Intro to CM&E . . . . .	--	1
COMM 110, Fund of Public Speaking . . . . .	--	3
ENGL 110, 120, College Composition I,II . . . .	3	3
MATH 165, Calculus I . . . . .	--	4
CM&E 212, Const Graphic Communication . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
CM&E 204, Constr Surveying . . . . .	--	2
CM&E 200, Constr Docs and Codes . . . . .	3	--
ACCT 102, Fund of Accounting . . . . .	--	3
Totals . . . . .	14	16

#### Second Year

PHYS 211/211L, College Physics I . . . . .	3,1	--
CM&E 205, Building Const . . . . .	--	3
CM&E 385, Construction Safety . . . . .	--	2
CM&E 240, Fin & Cost Concepts . . . . .	--	3
ECON 105, Elements of Economics . . . . .	3	--
Humanities Elective . . . . .	3	3
GEOL 105, Physical Geology . . . . .	3	--
CM&E 250, Applied Statics/Mech . . . . .	3	--
PSYC 111, Intro to Psychology . . . . .	--	3
Totals . . . . .	16	14

#### Third Year

BUSN 350, Found of Management . . . . .	3	--
BUSN 300/400 Elective . . . . .	--	3
BUSN 431, Business Law I . . . . .	--	3
CE 303, Civil Engr Materials . . . . .	--	3
CM&E 301, Const Tech & Equip . . . . .	--	4
CM&E 310, Const Quality Control . . . . .	--	2
CM&E 315, Specs & Contracts . . . . .	3	--
CM&E 320, Soils & Foundations . . . . .	4	--
CM&E 370, Intro to Cost Estimating . . . . .	2	--
ENGL 320,321, Intense Writing . . . . .	3	--
CM&E 411, Const Cost Estimating . . . . .	--	2
STAT 330, Intro to Statistics . . . . .	3	--
Totals . . . . .	18	17

#### Fourth Year

CM&E 403, Schedule & Project Control . . . . .	4	--
CM&E 412, Const Mgmt Capstone . . . . .	--	3
CM&E 421, Elect & Mech Const . . . . .	3	--
CM&E 430, Land Development . . . . .	3	--
CM&E 450, Steel Design for Tech . . . . .	3	--
CM&E 453, Concrete Design Const . . . . .	--	3
BUSN 300/400 Elective . . . . .	--	3
BUSN 300/400 Elective . . . . .	3	--
BUSN 300/400 Elective . . . . .	--	3
Wellness . . . . .	--	2
Totals . . . . .	16	14

**Curriculum Total . . . . . 129**

## Department of Electrical and Computer Engineering

[www.ece.ndsu.nodak.edu](http://www.ece.ndsu.nodak.edu)

The mission of the Department of Electrical and Computer Engineering is to provide quality educational opportunities for undergraduate and graduate students through teaching, research, and professional service, and to provide specialized support to the greater community.

**Departmental objectives:**

1. Prepare our students to become competent electrical and computer engineers.
2. Promote life-long learning practice through continuous curriculum review, research, design, and other scholarly activities.
3. Stimulate student and faculty professional development through publications, participation in professional meetings and societies, and research involvement.
4. Maintain and enhance a positive departmental environment conducive to teamwork, discovery, and professional development.
5. Promote public awareness, interest, and respect for science, engineering, and technology.
6. Provide specialized services to the region, industrial partners, and the professional community.

The intended student outcomes of this major are to provide students with: a) an ability to apply knowledge of mathematics, science, and engineering; b) an ability to design and conduct experiments, as well as to analyze and interpret data; c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability; d) an ability to function on multi-disciplinary teams; e) an ability to identify, formulate, and solve engineering problems; f) an understanding of professional and ethical responsibility; g) an ability to communicate effectively; h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context; i) a recognition of the need for, and an ability to engage in life-long learning; j) a knowledge of contemporary issues; k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice; l) ability to grow in the knowledge of and make professional contributions to at least on specific area of ECE.

Electrical and computer engineers create products and services for society out of materials that exist in nature by using principles of science and creativity. The profession is broad, encompassing products valued by society in many technical specialties from electric power and energy utilization to those for current and future information transmission. Career employment opportunities within the profession range over design, development, manufacturing, sales, management, teaching, and research for industry and government.

**Selective Admission**

Departmental admission requirements for freshmen are an ACT (or equivalent) math test score of 23, or a top 30 percent class standing with a math ACT of 20. Transfer students from U.S. institutions must have a 2.3 GPA; international students a 3.0 GPA.

Further, the department policy is that transfer credits with grades of D in mathematics, science, or engineering courses are not accepted for the Electrical and Computer Engineering curriculums.

An institutional GPA of 2.0 or above is required prior to registration in junior- and senior-level courses. Majors must have a grade of C or better in the following courses: all required mathematics courses through MATH 266; ECE 111, 173, 275, and EE 206.

**The Programs**

Major components of the undergraduate programs are basic science and mathematics, humanities and social sciences, communication, engineering science, engineering design and ethics, and both breadth and depth in electrical and computer engineering.

Graduate studies leading to Master of Science and Doctor of Philosophy degrees are offered in the department. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

**Computer Engineering Major**

The Computer Engineering program provides a background in three broad areas: computer hardware, software, and hardware-software integration. Fundamental computer topics included in the program are microprocessors, embedded systems, computer architecture, digital systems, data communications and other related computing material. In addition, the program includes core engineering subjects that are common to all engineering disciplines and basic university studies in humanities and social science.

**Recommended '06-07 Curriculum  
Computer Engineering Major**

	Credits	
	F	S
<b>First Year</b>		
CHEM 121, General Chemistry I	3	--
ECE 111, Intro to ECE	3	--
ECE 275, Digital Systems I	3	--
ENGL 110, 120, College Composition I, II	3	3
MATH 165, 166, Calculus I, II	4	4
PHYS 2511, Univ Physics I <b>or</b>		
ME 2212 Engr Mechanics I	--	4 (3)
UNIV 189, Skills for Academic Success	1	--
ECE 173, Intro to Computing	--	3
MATH 129, Basic Linear Algebra	--	2
Corequisite Science Lab	--	1
Totals	17-171	(162)

**Second Year**

CSCI 222, Discrete Math	3	--
EE 206, Circuit Analysis I	4	--
MATH 265, Calculus III	4	--
PHYS 252, Univ Physics II	4	--
ME 2211, Engr Mechanics I <b>or</b>		
ME 2222 Engr Mechanics II	3	--
COMM 110, Fund of Public Speaking	--	3
CSCI 161, Computer Science II	--	4
ECE 311, Circuit Analysis II	--	4
MATH 266, Intro Differential Equations	--	3
(Math/Science Elective <sup>2</sup> )	--	(3)
Totals	18 14	(172)-17

**Third Year**

ECE 321, Electronics I	5	--
ECE 343, Signals & Systems	4	--
ECE 351, Applied EM	4	--
CprE Core Elective	--	3
ECE 341, Random Processes	--	3
ECE 373, Assembly Programming	--	3
ECE 376, Embedded Systems	--	4
ECE 401, Design I	--	1
Humanities, Social Science Electives	3	3
Totals	16	17

**Fourth Year**

CprE Core Elective	3	3
CSCI 474, Operating System Concepts	3	--
ECE <b>or</b> Engr Science Elective	--	3
ECE 403, 405 Design II, III	2	3
ECE 443, Communications I	4	--
Wellness Elective	2	--
ENGR 402, Ethics & Social Resp	--	1
Humanities, Social Science Electives	3	3
Totals	17	13

**Curriculum Totals . . . . . 129<sup>1</sup> - (131)<sup>2</sup>**

<sup>1</sup> Using physics sequence.

<sup>2</sup> Using ME & Math/Science sequence.

Students must meet the university's general education requirements as well as the curriculum requirements in effect at the time of entrance into a program.

**Computer Engineering Electives**

The sample Computer Engineering curriculum contains student choices (electives) of many types. Students use approved general education courses to fulfill humanities/fine arts, social/behavioral sciences, and wellness electives. The following courses are recommended for computer engineering core (CprE Core), engineering science, ECE, and math/science electives:

**CprE Core Electives (9 credits)**

ECE 374, Computer Org & Architecture	3
ECE 375, Digital Sys Design/Implement	3
ECE 423, Digital Electronics	3
ECE 470, Digital Systems II	3

**Engineering Science Electives (0-3 credits)**

CSCI 366, Files for Database Systems	3
CSCI 372, Comparative Languages	3
CSCI 426, Intro to Artificial Intelligence	3
CSCI 458, Microcomputer Graphics	3
CSCI 459, Local Area Networks	3
CSCI 467, Algorithm Analysis	3
CSCI 475, Operating Systems Design	3
CSCI 477, Object-Oriented Systems	3

**ECE Electives (0-3 credits)**

ECE 411, Optics for Engr & Scientists	3
ECE 417, Optical Signal Transmission	3
ECE 421, Communication Circuits	3
ECE 425, Intro Semiconductor Devices	3
ECE 444, Applied Dig Signal Process	3
ECE 445, Communications II	3
ECE 453, Signal Integrity	3
ECE 455, Designing for Electromagnetic Compatibility	3
ECE 461, Control Systems	4
ECE 463, Digital Control	3
ECE 471, Comp Syst Design & Implementation	3
ECE 483, Instrumentation for Engineers	3
ECE 494, Individual Study	3
ECE 496, Field Experience	3

**Math/Science Elective (0-3 credits)**

CSCI 235, Theoretical Comp Science I	3
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Fact sheets, covering other specialty areas in electrical and computer engineering, are available from the department.

**Electrical Engineering Major**

The Electrical Engineering program at NDSU is accredited by the Engineering Accrediting Commission of the Accreditation Board for Engineering and Technology (ABET).

**EE Specialization**

The electrical engineering program is designed to reflect the broad nature of the field, and students may tailor their studies within broad parameters. Students are encouraged to develop an individual program of study in close consultation with their advisors. Examples are available to illustrate how specialization may be obtained in a number of different technical areas. Students may mix and match from the examples to suit their particular interests. Technical areas include the following:

**Biomedical Engineering:** This area is firmly based in engineering and the life sciences. The integration of medicine and engineering serves to provide appropriate



products, tools, and techniques for research diagnosis and treatment by health care professionals. Some important products are artificial hearts, medical imaging (MRI, ultrasound, CT scans), prosthetic devices, and computer aids to diagnosis. Biomedical engineers help identify the problems and needs that can be solved using engineering technology and systems methodology to provide high-quality health care at reasonable cost.

**Communication and Signal Processing:** These are closely related fields within electrical engineering. Communication is the process of transferring information from one point in time and space to another point. Signal processing involves signal representation, as well as signal design and filtering. Students with this specialization find challenging opportunities worldwide to meet the need for more convenient, inexpensive, and reliable communication and signal processing.

**Computer Engineering:** This area involves hardware and software for small and large computers and for all the products that have dedicated computers within the product, such as microwave ovens and automobiles.

**Control Engineering:** This is the design and implementation of algorithms for controlling physical systems. Examples include active suspension for cars, auto pilots for aircraft, and robot motion control.

**Electromagnetics:** This area includes electromagnetic compatibility, fiber optics, antennas, microwave devices, radar, sonar, satellite systems, power and communication transmission lines, grounding, shielding, and propagation.

**Electronics and Microelectronics:** Examples are integrated circuits, VLSI, transistors, lasers, consumer electronics, defense electronics, power electronics, and electronic materials.

**Optical Engineering:** The Optical Engineering option was developed jointly with the Department of Physics. Many technical disciplines now use optics. Medicine uses laser surgery and optical diagnostics. Communications is expanding optical fiber communication. Image processing is using optical techniques. The optical engineering option prepares future engineers in such areas as quantum theory; coherent/incoherent, polarized/non-polarized light; geometric, physical and Fourier optics; holography; and image processing and acquisition.

**Power Systems:** This area includes the generation, transmission, distribution, and utilization of electric energy subject to safety, environmental, and economic concerns.

## Recommended '06-07 Curriculum Electrical Engineering Major

	Credits	
	F	S
<b>First Year</b>		
CHEM 121, General Chemistry	3	--
ECE 111, Intro to ECE	3	--
ECE 275, Digital Systems I	3	--
ENGL 110, 120, College Composition I, II	3	3
MATH 165, 166, Calculus I, II	4	4
UNIV 189, Skills for Academic Success	1	--
ECE 173, Intro to Computing	--	3
MATH 129, Basic Linear Algebra	--	2
PHYS 2511, University Physics I <b>or</b>		
ME 2212, Engr Mechanics I	--	4(3)
Totals	17-161	(152)

	Credits	
	F	S
<b>Second Year</b>		
Corequisite Science Lab	1	--
EE 206, 311, Circuit Analysis I/II	4	4
ENGR SCI Elective1 <b>or</b>		
ME 2222, Engr Mechanics II	3	--
MATH 266, Calculus III	4	--
PHYS 252, Univ Physics II	4	--
COMM 110, Fund of Public Speaking	--	3
ENGR Sci <sup>1</sup> or Math/Sci <sup>2</sup> Elective	--	3
MATH 266, Differential Equations	--	3
(Math/Sci <sup>2</sup> Elective)	--	(3)
Social Science Elective	--	3
Totals	16-161	(192)

<b>Third Year</b>		
ECE 321, Electronics I	5	--
ECE 343, Signals & Systems	4	--
ECE 351, Applied EM	4	--
Humanities Elective	3	--
ECE Electronics Elective	--	3
ECE 341, Random Process	--	3
ECE 401, Design I	--	1
EE Core Elective	--	4
Math/Science Elective	--	3
Wellness Elective	--	2
Totals	16	16

<b>Fourth Year</b>		
ECE 403, 405 Design II, III	2	3
ECE Elective	3	3
ECE or Engr Science Elective	3	--
EE Core Electives	4	4
Engr 402, Engr Ethics & Soc Responsibility	1	--
Humanities, Social Science Elective	3	3
Totals	16	13

**Curriculum Total** 126<sup>1</sup>-(128<sup>2</sup>)

- Using physics sequence.
- Using ME & math/science sequence.

Students must meet the university's general education requirements as well as the curriculum requirements in effect at the time of entrance into a program.

## Electrical Engineering Electives

The sample Electrical Engineering curriculum contains student choices (electives) of many types. Students use approved general education courses to fulfill humanities/fine arts, social/behavioral sciences, and wellness electives. The following courses are recommended for EE core, electronics, ECE, engineering science, and math/science electives:

<b>EE Core Electives (3 out of 4)</b>		
ECE 331, Energy Conversion	4	
ECE 376, Embedded Systems	4	
ECE 443, Communications I	4	
ECE 461, Control Systems	4	
ECE Electronics Electives (3 credits)		
ECE 421, Communication Circuits	3	
ECE 423, Digital Electronics	3	
ECE 425, Intro Semi-Conductor Devices	3	
ECE 437, Power Electronics	3	

<b>ECE Electives</b>		
ECE 373, Assembly Lang/CPU Arch	3	
ECE 374, Computer Organization	3	
ECE 375, Dig Sys Design & Implem	3	
ECE 411, Optics for Engineers & Scientists	3	
ECE 417, Optical Signal Transmission	3	
ECE 431, Power Systems	3	
ECE 433, Power Systems Design	3	
ECE 444, Digital Signal Processing	3	
ECE 445, Communications II	3	
ECE 453, Signal Integrity	3	
ECE 455, Electromagnetic Compatibility	3	
ECE 463, Digital Control	3	

	Credits	
ECE 470, Digital Systems II	3	
ECE 471, Comp Sys Design & Implem	3	
ECE 483, Instrumentation for Engineers	3	
ECE 485, Biomedical Engineering	3	
ECE 487, Cardiovascular Engineering	3	
ECE 494, Individual Study	3	
ECE 496, Field Experience	3	

## Engineering Science Electives

CE 309, 310, Fluid Mechanics, Lab	3,1	
CSCI 161, Comp Science II	4	
CSCI 366, Files for Database Sys	3	
CSCI 372, Comparative Prog Lang	3	
CSCI 426, Intro to Artificial Intelligence	3	
CSCI 458, Microcomputer Graphics	3	
CSCI 459, Local Area Networks	3	
CSCI 467, Algorithm Analysis	3	
CSCI 474, Operating Systems Concepts	3	
CSCI 475, Operating Systems Design	3	
CSCI 477, Object-Oriented Systems	3	
IME 440, Engineering Economy	2-3	
IME 456, Program & Project Mgt	3	
IME 461, Quality Assurance & Control	3	
ME 221, Engineering Mechanics I	3	
ME 222, Engineering Mechanics II	3	
ME 223, Mechanics of Materials	3	
ME 350, Thermodynamics/Heat	3	
ME 411, Nuclear Engineering	3	
PHYS 363, Optics	3	
PHYS 402, Engineering Physics II	3	

## Math/Science Electives

BIOL 150, General Biology I	3	
CHEM 122, General Chemistry II	3	
CHEM 341, Organic Chemistry I	3	
CHEM 364, Physical Chemistry I	4	
CSCI 222, Discrete Mathematics	3	
CSCI 235, 236, Theoretical Comp Sci I, II	3,3	
MATH 270, Intro to Abstract Math	3	
MATH 429, Linear Algebra	3	
MATH 420, 421, Abstract Algebra I, II	3,3	
MATH 450, 451, Real Analysis I, II	3,3	
MATH 452, Complex Analysis	3	
MATH 480, Applied Diff Equations	3	
MATH 481, Fourier Analysis	3	
MATH 483, Partial Dif Equations	3	
MATH 488, 489, Numerical Analysis I, II	3,3	
PHYS 350, Modern Physics	3	
PHYS 401, Engr Physics I	3	
PHYS 485, Quantum Mechanics I	3	
STAT 450, Stochastic Processes	3	
STAT 451, Bayesian Stat Decision Theory	3	
STAT 468, Probability & Math Stat I	3	

For students interested in pursuing one of the areas of specialization, lists of recommendations for specific electives are available from the ECE Department.

## Department of Industrial and Manufacturing Engineering

[www.ndsu.edu/ndsu/ime/](http://www.ndsu.edu/ndsu/ime/)  
Two majors are offered within the Industrial and Manufacturing Engineering Department (IME): Industrial Engineering and Management (IE&M) and Manufacturing Engineering (MfgE). Both programs are professionally accredited through the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Career positions for graduates of the two programs often have some similarity; so, many of the courses required for the two majors are the same. One of the simple ways to distinguish between IE&M and MfgE is to note that industrial engineering and management applies engineering thinking to all manner of commer-

cial and industrial enterprises, while everything that a manufacturing engineer does relates in some way to the production of goods. Following the differing ways that graduates are employed in career positions, the two IME programs are differentiated by specific courses that address particular needs of the respective career tracks. IE&M students take additional courses in systems engineering and in the application of engineering skills in people management. MfgE students take additional courses in the analysis and design of manufacturing processes and of production systems.

In addition, both majors offer the student opportunities for a small amount of specialization in the junior and senior years. IE&M students can apply their elective courses to extra study in production operations and management, healthcare management engineering, and reliability and quality management. MfgE students can elect additional specialization in electronics manufacturing and process engineering.

Both IE&M and MfgE students learn in an environment of professional realism. Many of the major courses fulfill their learning objectives through projects that are done with industrial companies. Students interact with practicing professionals to learn the real-world applications of the theories they master in the classrooms. There also are many laboratories where students gain hands-on understanding of machinery and engineering systems. Students in both IME majors are urged to take advantage of cooperative education and internship positions wherever possible. The knowledge gained through these experiences enhances career preparation and provides for expanded placement opportunity upon graduation.

Learning in the IME department is a partnership of student and faculty. The student's responsibility is to learn - to master the concepts, theories and practices that lead to career success. The faculty responsibility is four-fold: to provide an atmosphere that is conducive to learning; to assure availability of the tools necessary for effective and efficient learning; to offer guidance on educational and professional matters; and to evaluate student achievement. The usual faculty role is one of mentor, encouraging students to grow in stature as soon-to-be engineers and as human beings.

IME graduates are prepared for careers that design, develop and implement devices, processes and systems that manufacture, construct, operate and service products, equipment and facilities that are often conceived in other engineering disciplines. Career positions in IE&M and MfgE form the vital linkages between abstract concepts and the reality of products and facilities of real use to customers. Graduates are in demand for employment in a very wide range of industries from production of all types of goods to transportation and distribution to information to healthcare to consulting.

In all cases, career positions for IME graduates involve design of processes and procedures in advanced technology environments. These professions routinely apply sophisticated modern tools in information handling, distributed communications, computer-driven controls, and a wide variety of technologically advanced equipment and apparatus. In addition, IME career professionals are skilled in the integration of people and technology within the business context of world-class enterprises. They make satisfying careers in organizations of all sizes and types, located in all parts of the world. Graduates generally have wide choice in where they want to work and live, and what size and kind of company they want to work for.

Post-graduate studies also are available in the IME department, leading to the Master of Science and Doctor of Philosophy degrees. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

## Industrial Engineering and Management Major

Industrial Engineering and Management is a good choice for people with the aptitude and interest for careers that blend technology and people. First, this is an engineering program, with the traditional content of mathematics, sciences, engineering analysis and design. Graduates are traditionally very successful in nationally-normed professional engineering examinations. Beyond the basics, this program also challenges students to integrate resources with technology. In addition to scientific principles and technological systems, IE&M students study people systems, cost analysis, facilities and other elements of the business enterprise. The "engineering" and "management" pieces are blended and integrated.

Just as the profession requires a blend of scientific, technological and humanistic skills, student learning in IE&M is an integrated process. The discipline-specific courses place the student in position to experience many elements of real situations in industry and commerce. Moreover, the program has been nationally cited for integrating design across all levels, with freshmen and juniors or sophomores and seniors often working together.

Graduates of the IE&M program will be able to:

1. Apply statistical, operations research and simulation tools to solve problems relevant to modern production, commercial, social and /or governmental organizations, with principal emphasis on quality, productivity, continuous improvement, and enterprise integration.
2. Design processes and systems to effectively and economically employ and integrate technology and people in organizational environments in industrial, healthcare, logistics, service and/or governmental settings, with appropriate consideration for environmental factors, health and safety, manufacturability and ethical, economic, social and political issues.
3. Engage in effective learning in topics and areas relevant to professional advancement and to enhancing the quality of personal life.
4. Participate effectively in multidisciplinary teams in both leadership and followership roles.
5. Effectively communicate complex technological concepts, issues and professional details to a variety of audiences.

IE&M graduates are in high demand across a wide spectrum of industries. In recent years, the most active employers have represented transportation, warehousing and distribution, healthcare, information systems, software, facilities development and consulting industries, as well as many of the production sectors that have been the traditional concentration for industrial engineers. IE&M graduates are sought after for responsible positions in project and organizational management, financial modeling, technological training, logistics, and design of processes, procedures, facilities, and systems.

## Recommended '06-07 Curriculum Industrial Engineering and Management Major

	Credits	
First Year	F	S
CHEM 121, 121L, General Chemistry I, Lab . . . . .	3	1
ENGL 110, 120 College Composition I, II . . . . .	3	3
IME 111, Intro to IME . . . . .	--	1
IME 112, Comp/Software Apps Engr . . . . .	--	2
MATH 165, 166, Calculus I, II . . . . .	4	4
ME 212, Fund of Visual Communication . . . . .	--	3
ME 221, Engineering Mechanics I . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Computer Science Elective . . . . .	3	--
Totals . . . . .	15	16

## Credits

Second Year	F	S
COMM 110, Fund of Public Speaking . . . . .	3	--
IME 311, Work/Station Design . . . . .	--	3
IME 330, Manufacturing Processes I . . . . .	3	--
IME 440, Engineering Economy . . . . .	--	3
MATH 129, Basic Linear Algebra . . . . .	2	--
MATH 259, Multivariate Calc. . . . .	3	--
MATH 266, Intro to Diff Equations . . . . .	--	3
PHYS 252,252L Univ Physics II, Lab . . . . .	--	4,1
ME 222, Engineering Mechanics II . . . . .	3	--
Science & Engineering Electives <sup>1</sup> . . . . .	3	3
Totals . . . . .	17	17

## Third Year

IME 450, Systems Engr & Mgmt . . . . .	3	--
IME 460, Evaluation of Engr Data . . . . .	3	--
IME 461, Quality Assurance & Control . . . . .	--	3
IME 470, Operations Research I . . . . .	--	3
IME 472, Simulation Bus & Ind Systems . . . . .	--	3
General Education Electives . . . . .	3	3
Science & Engineering Elective . . . . .	3	--
Technical Electives . . . . .	3	3
Wellness . . . . .	2	--
Totals . . . . .	17	15

## Fourth Year

ENGR 402, Engr Ethics & Social Resp . . . . .	1	--
IME 456, Program & Project Mgmt . . . . .	--	3
IME 462, Total Quality in Industrial Mgmt . . . . .	3	--
IME 480, Prod & Inventory Control . . . . .	3	--
IME 482, Automated Mfg Systems . . . . .	3	--
IME 485, Ind & Mfg Facility Design . . . . .	--	3
General Education Elective . . . . .	--	6
Science & Engineering Elective . . . . .	3	--
Technical Electives . . . . .	3	3
Totals . . . . .	16	15

**Curriculum Total . . . . . 128**

<sup>1</sup> At least one science and engineering elective must satisfy General Education category "Science & Technology."

## Industrial Engineering and Management Minor

Students majoring in any engineering discipline may elect a minor in Industrial Engineering and Management. These optional studies offer engineering students the opportunity to add important career-enhancing skills to their technological competencies. The elected courses in an IE&M minor add skills for integrating technology and resources within the complex of people, technology, machinery and information that make up the successful modern business enterprise. Students completing this minor will achieve better understanding of organizational and management processes and will be better prepared to work in the multi-functional teams crucial to success in industry.

Minors at NDSU require a minimum of 16 credits. The foundation requirements for the IE&M minor are Survey of Industrial Systems Applications (IME 310) and Work/Station Design and Measurement (IME 311). The remaining 10 credits may be selected from any IME 300- and 400-level courses for which prerequisites are in place. The only exception is Evaluation of Engineering Data (IME 460), which does not count toward this minor.

Students must complete the graduation requirements for another engineering major before the designation of the IE&M minor will be placed on their transcripts.

## Management Sequence for Non-Majors

The practices and procedures learned in the Industrial Engineering and Management major are universally applied in public and private organizations of all kinds.

IE&M courses are available as electives for students majoring in computer science, mathematics, sciences, business administration, cereal science, agricultural economics, and facility management. Courses recommended for non-majors are: Ind & Systems Engineering (IME 310), Engineering Economy (IME 440), Mgmt of People Systems (IME 455), Program & Project Mgmt (IME 456), and Evaluation of Engineering Data (IME 460).

### Industrial Engineering and Management Areas of Emphasis

Students majoring in Industrial Engineering and Management may prepare for specific career choices by careful use of the technical electives included in the IE&M major. It is suggested that students confer with their academic advisor for assistance in choosing the most appropriate optional courses. Particular areas of emphasis may be selected in the following special interests:

- Healthcare management engineering
- Production operations and management
- Process and production engineering
- Reliability and quality management
- Lean manufacturing
- Specialized manufacturing processes (electronics, aircraft, plastics and composites)

These topical areas are also available for post-graduate study, leading to the Master of Science in Industrial Engineering and Management and the Doctor of Philosophy in Industrial and Manufacturing Engineering degrees. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

### Manufacturing Engineering Major

Manufacturing Engineering is a good choice for people who have both aptitude and interest in production of goods for improved living standard for the general populace. This career field is all about the production of goods - from automobiles and tractors and airplanes ... to electronic products to recreational products, sports equipment, books and toys ... to foodstuffs. Manufacturing engineers are employed in every industry that produces goods of some kind.

Manufacturing engineers may focus on the interaction between work piece and tool as process scientists or process engineers. They may concentrate on integrating the many different processes and parts necessary to make up finished products - as production engineers. Or, as manufacturing systems engineers, they may take a very wide view of the manufacturing enterprise, including its supply chain, distribution channels, financial structure and resource management. In every particular focus, manufacturing engineers are the people who design the processes through which products are made with the required functionality, to high quality standards, in the quantities needed, available when and where customers prefer, and at the best possible price.

Every day, manufacturing engineers make decisions about technology, machinery, people, and money. The preparation for the excitement and challenge of modern manufacturing requires students to master the mathematics and applied science common to all engineering disciplines. They then will master the fundamentals of process engineering and production engineering so that they may apply these principles to production of any type of goods.

Graduates of the Manufacturing Engineering program will be able to:

1. Solve problems relevant to modern manufacturing industries, with principal emphasis on process engineering and production engineering, as well as selected aspects of process science and the manufacturing enterprise.
2. Design competitive manufacturing processes and production systems, integrating machinery, technology, people and money, with appropriate consideration for environmental factors, health and safety, sustainability and ethical, economic, social and political issues.
3. Engage in effective learning in topics and areas relevant to professional advancement and to enhancing the quality of personal life.
4. Participate effectively in multi-disciplinary teams in both leadership and followership roles.
5. Effectively communicate complex technological concepts, issues and professional details to a variety of audiences.

At graduation, Manufacturing Engineering students are well positioned to select career employment in any manufacturing industry. Graduates are actively recruited by companies that produce agricultural and construction machinery and vehicles, complex industrial apparatus, recreational vehicles, airplanes, household goods, building products, and both industrial and consumer electronics. Manufacturing Engineering graduates generally begin their careers designing processes and production systems or directly managing some phase of manufacturing. Frequently, they progress to increased responsibilities, with broader scope and yet more opportunity.

### Recommended '06-07 Curriculum Manufacturing Engineering Major

	Credits	
	F	S
<b>First Year</b>		
CHEM 121, 121L, General Chemistry I, Lab . . . . .	3,1	--
ENGL 110, 120, College Composition I, II . . . . .	3	3
IME 111, Intro to IME . . . . .	--	1
IME 112, Computer Software Apps . . . . .	--	2
MATH 165, 166, Calc I, II . . . . .	4	4
ME 212, Fund of Visual Comm. . . . .	--	3
ME 221, Engineering Mechanics I . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Computer Science Elective . . . . .	3	--
Totals . . . . .	15	16
<b>Second Year</b>		
COMM 110, Fund of Public Speaking . . . . .	3	--
IME 311, Work/Station Design . . . . .	--	3
IME 330, Mfg Processes I . . . . .	--	3
IME 440, Engineering Economy . . . . .	--	3
MATH 128, Intro to Linear Algebra . . . . .	1	--
MATH 259, Multivariate Calc. . . . .	3	--
MATH 266, Intro to Diff Equations . . . . .	--	3
ME 222, Engr Mechanics II . . . . .	3	--
PHYS 252, 252L Univ Physics II, Lab . . . . .	--	4,1
Science & Engineering Electives <sup>1</sup> . . . . .	3	3
Totals . . . . .	16	17
<b>Third Year</b>		
IME 380, CAD/CAM for Mfg. . . . .	3	--
IME 430, Process Engineering . . . . .	3	--
IME 431, Production Engineering . . . . .	--	3
IME 460, Eval of Engr Data . . . . .	3	--
IME 461, Quality Assurance & Control . . . . .	--	3
ME 331, Engr Materials I . . . . .	--	4
General Education Elective . . . . .	3	--
Science & Engineering Elective . . . . .	--	3
Technical Electives . . . . .	3	3
Wellness Elective . . . . .	2	--
Totals . . . . .	17	16

	Credits	
	F	S
<b>Fourth Year</b>		
ENGR 402, Engr Ethics & Soc Resp . . . . .	1	--
IME 432, Composite Materials Mfg . . . . .	3	--
IME 456, Program & Project Mgmt . . . . .	--	3
IME 480, Prod & Inventory Control . . . . .	3	--
IME 482, Automated Mfg Systems . . . . .	3	--
IME 489, Mfg Engineering Capstone . . . . .	--	3
General Education Electives . . . . .	3	6
Technical Electives . . . . .	3	3
Totals . . . . .	16	15
<b>Curriculum Total . . . . .</b>	<b>128</b>	

<sup>1</sup> At least one science and engineering elective must satisfy General Education category "Science & Technology."

### Manufacturing Sequences for Non-Majors

Most industrial enterprises engage in the production of some sort of goods in some way and to some degree. Students majoring in other disciplines can enhance their career value by expanding their knowledge of process engineering and production engineering.

For students majoring in other engineering disciplines or in the agricultural or physical sciences, the technological foundations of manufacturing can be acquired through Manufacturing Processes I (IME 330), Process Engineering (IME 430) and Production Engineering (IME 431). Also, engineering majors from other disciplines may elect to acquire more depth in electronics manufacturing (IME 427) and plastics and composite manufacturing (IME 432, 435).

### Manufacturing Engineering Areas of Emphasis

Students majoring in Manufacturing Engineering may prepare for specific career choices by careful use of the four technical electives included in the Manufacturing Engineering major. It is suggested that students confer with their academic advisor for assistance in choosing the most appropriate optional courses. The Manufacturing Engineering major requires that students select 12 credits of approved elective courses, and these may be selected in the following special interests:

- Electronics manufacturing
  - Process engineering
  - Production and manufacturing systems engineering
- These topical areas also are available for post-graduate study, leading to Master of Science in Manufacturing Engineering and Doctor of Philosophy in Industrial and Manufacturing Engineering degrees. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

## Department of Mechanical Engineering and Applied Mechanics

[www.ndsu.edu/me/](http://www.ndsu.edu/me/)  
Mechanical engineering is a broad field primarily concerned with the principles of motion, energy, and force. Mechanical engineers are called upon to design machinery, mechanisms, and systems that function safely, reliably, and efficiently to serve needs of society. To accomplish this, mechanical engineers apply scientific principles to problems that involve the motion of heat, gases, fluids, and solid materials.

Mechanical engineers may be found in nearly all segments of society. They work in industry, consulting practices, government facilities, and universities. In industry, mechanical engineers work for equipment manufacturers, utilities, material processing plants, environmental firms, and companies that deal with

aerospace, transportation, petroleum, biomedical products, and others. Mechanical engineers employed by the government and universities contribute to the betterment of society by conducting research to solve present and future problems. As technology becomes more prevalent in daily life, mechanical engineers are increasingly called upon to apply that technology to develop devices that improve the standard of living.

## Mechanical Engineering Major

The Mechanical Engineering program at NDSU is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). The curriculum is designed to produce baccalaureate-level graduates who are well prepared to accept engineering positions in industry and government or to pursue advanced degree studies.

The mission of the Mechanical Engineering Department is to educate undergraduate and graduate students in the fundamentals of the discipline and to prepare graduates to effectively function in society in the field of their choice while also having the learning skills to adapt to evolving personal and professional goals. To accomplish this mission, the department has established the following educational objectives:

1. To provide our students with a fundamental understanding of the engineering sciences in the areas relevant to the field of mechanical engineering.
2. To provide our students with the ability to develop the skills and apply the knowledge and tools relevant to the field of mechanical engineering.
3. To provide our students with the team-working skills and communications skills required for effectively interacting with people of varying technical background.
4. To provide our students with a broad view of the context in which their designs will be implemented and the corresponding impact on society.

A complete listing of the program outcomes associated with these objectives can be viewed on the department's website at [www.ndsu.edu/me/mission.htm](http://www.ndsu.edu/me/mission.htm).

Strong program emphasis is placed on engineering science, laboratory, and design. The use of modern computer tools and techniques in engineering practice is also incorporated throughout the curriculum. In addition, liberal arts education is included to prepare graduates for becoming concerned and productive members of society.

Students transferring into mechanical engineering from other departments or institutions are encouraged to do so no later than the beginning of the junior year if they wish to complete the degree requirements within two academic years.

Graduate programs leading to Master of Science and Doctor of Philosophy degrees in Mechanical Engineering are offered by the department. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

## Selective Admission

The Department of Mechanical Engineering has a selective admission policy. To be admitted to the basic program (freshman and sophomore level), freshmen applicants must either rank in the top one-third of their high school graduating class or have received a score of 26 or higher in the math portion of the ACT. Transfer students, whether from another university or within another department at NDSU, must have an institutional grade point average (GPA) of at least 2.8.

To enter the professional program (junior and senior level), students must complete the basic program with an institutional GPA of 2.8 and with no grade below C in any one of the core courses.

A minimum institutional GPA of 2.5 is required for graduation from Mechanical Engineering. No course grades less than C are acceptable to fulfill a program requirement.

## Curriculum Options

Mechanical Engineering majors may choose one of two options to complete their program of study.

All Mechanical Engineering majors have a common curriculum during the first two years. At the beginning of the third year, students choose one of the following curriculum options:

**Standard:** Students who are interested in exploring a spectrum of technical electives may follow the Standard curriculum and choose a minimum of five technical elective courses. These courses cover a wide range of topics and students may tailor their choices to reflect their special interests in solid mechanics and design, thermal sciences, materials and nanotechnology, injection molding, biomechanical engineering, or other areas as added in the future. For a complete list of technical electives available in each area, students should consult with their advisor or the department.

**Coatings and Polymeric Materials:** This option is for students wishing to prepare for a career as a mechanical engineer in the plastics and coatings industries, or for a career in a manufacturing industry as a mechanical engineer with expertise in the fields of plastics and coatings. The Coatings and Polymeric Materials option in Mechanical Engineering at NDSU is a unique program offered nowhere else in the United States. Upon completion of this option, students are eligible to receive a minor in Coatings and Polymeric Materials.

Numerous career opportunities for mechanical engineers with this specialized training are available in the coatings industry, which manufactures paints and coatings to enhance and preserve such items as automobiles, ships, steel structures, machines, and household appliances. Many other opportunities are available in various manufacturing industries where more and more components previously fabricated from metals are now made from plastics and fiber-reinforced composite materials.

Due to the unique nature of this program, the demand for graduates far exceeds the supply.

## Recommended '06-07 Curriculum Mechanical Engineering Major

<i>All Options</i>		<i>Credits</i>	
<i>First Year</i>	<i>F</i>	<i>S</i>	
CHEM 121, 122, General Chemistry I, II . . . . .	3	3	
ENGL 110, 120, College Composition I, II . . . . .	3	3	
MATH 165, 166, Calculus I, II . . . . .	4	4	
ME 189, Skills for Academic Success . . . . .	1	--	
ME 212, Fund of Visual Communication . . . . .	--	3	
ME 221, Engr Mechanics I . . . . .	--	3	
Humanities/Social Science Electives . . . . .	6	--	
Wellness . . . . .	--	2	
Totals . . . . .	17	18	

<i>Second Year</i>			
COMM 110, Fund of Public Speaking . . . . .	--	3	
IME 330, Mfg Processes I . . . . .	3	--	
MATH 129, Basic Linear Algebra . . . . .	2	--	
MATH 259, Multivariate Calc. . . . .	3	--	
MATH 266, Intro Diff Equations . . . . .	--	3	
ME 213, Modeling of Engr Systems. . . . .	--	3	
ME 222, Engr Mechanics II. . . . .	3	--	
ME 223, Mech of Materials . . . . .	3	--	
ME 351, Thermodynamics I . . . . .	--	3	
PHYS 252, 252L, Univ Physics II, Lab . . . . .	4,1	--	
(P&C Option) Social Sci Elective. . . . . (3)	--	--	
Humanities Elective . . . . .	3	--	
Totals . . . . .	17(20)	17	

<i>Standard Option</i>		<i>Credits</i>	
<i>Third Year</i>	<i>F</i>	<i>S</i>	
ECE 301, 306 Electrical Engr I, Lab . . . . .	3	1	
ECE 303, Electrical Engr II . . . . .	--	3	
ENGL 321, Tech Writing for Engineers. . . . .	3	--	
ME 331, Engr Materials I . . . . .	4	--	
ME 352, Fluid Dynamics. . . . .	3	--	
ME 423, Interm Mech of Materials . . . . .	--	3	
ME 454, Heat & Mass Transfer . . . . .	--	3	
ME 455, Mech Systems Lab I . . . . .	--	1	
Technical Elective <sup>1</sup> . . . . .	3	3	
Totals . . . . .	16	14	

<i>Fourth Year</i>			
ENGR 402, Engr Ethics & Social Resp . . . . .	1	--	
ME 412, Engr Measurements. . . . .	3	--	
ME 421, Theory of Vibrations . . . . .	--	3	
ME 442, Machine Design I . . . . .	3	--	
ME 456, Mech Systems Lab II. . . . .	1	--	
ME 461, Design Project I. . . . .	3	--	
ME 462, Design Project II. . . . .	--	3	
Social Science Elective . . . . .	--	3	
Technical Electives <sup>1</sup> . . . . .	3	6	
Totals . . . . .	14	15	

**Curriculum Total. . . . . 128**

## Coatings and Polymeric Materials Option

<i>Third Year</i>			
CHEM 341, 341L, Org Chemistry I, Lab . . . . .	3	1	
CHEM 342 Org Chemistry II . . . . .	--	3	
ECE 301, 306 Elect Engr I, Lab. . . . .	3	1	
ECE 303, Electrical Engr II . . . . .	--	3	
Engr 321, Tech Writing for Engineers. . . . .	3	--	
ME 331, Engr Materials I . . . . .	4	--	
ME 352, Fluid Dynamics. . . . .	3	--	
ME 423, Interm Mech of Materials . . . . .	--	3	
ME 455, Mech Systems Lab I . . . . .	--	1	
CPM 499, Lab Safety. . . . .	1	--	
Technical Electives <sup>1</sup> . . . . .	--	6	
Totals . . . . .	17	18	

<i>Fourth Year</i>			
ENGR 402, Engr Ethics & Social Resp . . . . .	--	1	
ME 412, Engr Measurements. . . . .	--	3	
ME 421, Theory of Vibrations . . . . .	--	3	
ME 442, Machine Design I . . . . .	3	--	
ME 454, Heat & Mass Transfer . . . . .	3	--	
ME 456, Mech Systems Lab II. . . . .	1	--	
ME 461, Design Project I. . . . .	3	--	
ME 462, Design Project II. . . . .	--	3	
ME 473, Engr Plastics for Design. . . . .	3	--	
ME 474, Mech of Comp Materials . . . . .	--	3	
CPM 474, 484, Coatings I, Lab. . . . .	3,2	--	
CPM 475, Coatings II . . . . .	--	3	
Totals . . . . .	18	16	

**Curriculum Total. . . . . 141**

<sup>1</sup> *Technical electives: Student must select five of the following courses: ME 332, 341, 353, 415, 471, 472, 473, 474, 475, 477, 479, 481, 482, 484, 485, 486, 487, and 489 or other as approved.*

## Aviation Program

A program of flight training is available, which prepares students for the FAA examinations for the Private Pilot's License. Three courses are offered under this program: ME 311 Introduction to Aviation, ME 312 Introduction to Flight, and ME 313 Commercial Instrument Ground School.

Any student enrolled at NDSU or one of the other two Tri-College institutions may enroll in this program. No other courses are required as prerequisites.

## Cooperative Education

Students in Mechanical Engineering may participate in the Cooperative Education program at NDSU starting in their sophomore year. Students gain valuable industrial experience to complement their academic studies. Internships may last from one to three semesters.

Wages and benefits for co-op students are determined by the employer and are influenced by such factors as established wage scales, the co-op student's responsibilities, and the nature of the employer's business.

## Department of Military Science Military Science (Army ROTC)

[www.ndsu.edu/ndsu/armyrotc/](http://www.ndsu.edu/ndsu/armyrotc/)

The Army Reserve Officers Training Corps (Army ROTC) program is conducted by the Department of Military Science. Army ROTC gives students the opportunity to become involved in a unique program that adds the leadership dimension to their college education. It also provides several financial assistance options. Students, regardless of their majors, are eligible to participate in this program. The primary objective of the program is to provide the knowledge and skills required for men and women to serve as commissioned officers in the active Army, Army Reserve, or Army National Guard. NDSU's Military Science Department is seeking students who have leadership potential, particularly those who are scholars, athletes, and leaders.

The Army ROTC program is a four-year program of instruction in the military sciences taken in conjunction with a normal curriculum. Advanced placement credit may be received for previous or current military service. The program, (requiring a minimum of 22 credit hours) can lead to a minor in military science. The program is divided into two parts: the basic course and the advanced course.

The basic course is normally taken during the freshman and sophomore years. Students participating in the basic course incur no military obligation or commitment. Instruction offered in the basic course include: physical fitness class, military leadership and management, land navigation, U.S. military history, first aid, tactics, and drill and ceremonies. Military skills laboratories also are offered. These include adventure activities such as rappelling, rope bridging, tactics, military equipment use, drill and ceremony, survival techniques, and a leadership reaction course.

Students entering the advanced course must have a minimum of two years of academic work remaining in a curriculum leading to either a baccalaureate or graduate degree. Students may qualify for entry into the advanced course by one of the following: completing basic training, attending the five-week ROTC Leaders Training Course (LTC), or having prior military service in any of the armed forces of the United States. Members of the Army National Guard or Army Reserve may qualify for direct entry into the advanced course and can maintain membership in their Guard/Reserve Unit by enrolling for the Simultaneous Membership Program (SMP) option.

Scholarship cadets and advanced course students receive a monthly monetary tax-free allowance of \$250 to \$400 per month (tiered from freshman through senior year).

Advanced course students receive instruction in advanced leadership and management and are afforded the opportunity to apply their acquired knowledge to practical situations. Military skills laboratories are also offered. In addition to the listed military science curriculum, advanced course students must complete an approved course in written communication skills, military history, and computer literacy.

Students also attend the five-week Leader Development and Assessment Course (LDAC) at Fort Lewis, Wash. (near Tacoma) between the first and second year of the advanced course. The Leader Development and Assessment Course is designed to develop and evaluate a student's judgment and decision-making abilities, build physical endurance and self-confidence, and allow a student to apply leadership skills. Leadership positions are rotated among the students so that each person experiences firsthand what it takes to apply leadership skills and develop an organization.

Four-, three-, and two-year scholarships are available. Army ROTC scholarships provide for payment of tuition and fees, receive \$300 per semester for books and equipment, and an allowance of \$250 to \$400 per month for each year the scholarship is in effect. Generally, four-year scholarships are awarded to high school students who wish to compete during their senior year for a scholarship, but college freshmen also have been awarded this highly desirable scholarship.

Students who do not qualify for the ROTC program or who do not wish to pursue an officers' commission may audit courses in the advanced ROTC program, if approved by the professor of military science. Auditing students' participation is limited to the classroom and they are not eligible for monetary allowances.

For detailed information on the Army ROTC program, contact the Department of Military Science, 1-800-798-7575 or 231-7575, Room 103 Bentson/Bunker Fieldhouse or visit our Web site.

## Recommended '06-07 Curriculum Military Science Minor

	Credits	
	F	S
<b>Basic Course</b>		
MS 110, Army ROTC Fitness . . . . .	2	2
MS 101, Foundations of Officership . . . . .	1	--
MS 102, Basic Leadership . . . . .	--	1
MS 201, Indiv Leadership Studies . . . . .	2	--
MS 202, Leadership & Teamwork . . . . .	--	2
<b>Advanced Course</b>		
MS 301, Leadership & Prob Solv. . . . .	3	--
MS 302, Leadership & Ethics . . . . .	--	3
MS 313, Advanced Camp Summer (Jr Year)		
MS 320, Leadership Lab . . . . .	1	1
MS 401, Leadership & Mgmt . . . . .	3	--
MS 402, Officership. . . . .	--	3
MS 420, Leadership Lab . . . . .	1	1
Totals . . . . .	13	13

# COLLEGE OF HUMAN DEVELOPMENT AND EDUCATION

[www.ndsu.edu/bde](http://www.ndsu.edu/bde)

E. Morrow Lebedeff Hall 255 (701) 231-8211

Virginia Clark Johnson, Dean

The College of Human Development and Education was established in July 1992. There are four academic units in the college: Apparel, Design, Facility and Hospitality Management; Child Development and Family Science; Education; and Health, Nutrition and Exercise Sciences. The Center for 4-H Youth Development also is a part of the college. Students are prepared for careers in education, colleges and universities, business and industry, community services, hospitals and health care facilities, and public and private programs concerned with design, human welfare, fitness, and recreation.

## Mission

The mission of the College of Human Development and Education is to provide educational programs and conduct research and other scholarly activities that focus on the lives of individuals and their families as they interact in work, educational, and living environments.

Opportunities are provided to broaden the student's understanding and appreciation of the aesthetic, cultural, economic, physical, psychological, and social elements that influence individual and family well being. Programs are designed to help each student develop professional competencies, attain a liberal education, and relate the learnings from the basic disciplines to various applications.

## Accreditation

The Center for Child Development is accredited by the National Association for the Education of Young Children. The Couple and Family Therapy program is accredited by the Council on Accreditation for Marriage and Family Therapy Education. The Athletic Training program is certified by the National Athletic Training Association. Education programs are accredited by the National Council for Accreditation of Teacher Education and approved by the North Dakota Education and Standards Practice Board.

The School Counseling and Community Counseling programs are accredited by the Council for the Accreditation of Counseling and Related Educational Programs. **The Educational Leadership program is accredited by the Educational Leadership Constituent Council.** The Dietetics program is accredited by the American Dietetic Association. The Interior Design program is accredited by the Council for Interior Design Accreditation, formerly the Foundation for Interior Design Education Research.

The Human Performance and Fitness program is endorsed by the American College of Sports Medicine. Family Financial Planning is approved by the Certified Financial Planner (CFP) Board of Standards. Hospitality and Tourism Management is accredited by the International Council on Hotel, Restaurant, and Institutional Education.

## Degree Programs

Undergraduate programs in the college lead to a Bachelor of Science or a Bachelor of Arts degree. Recommendation of candidates for teacher certification also rests within this college through the School of Education.



Graduate study leading to a Master of Science degree is offered in Child Development and Family Science, Counseling and Guidance, Merchandising, Educational Leadership, Athletic Training, Sport and Recreation Studies, Exercise Science, Nutrition, Physical Education, Public Health, Sport Pedagogy, and Teacher Education. A Master of Education degree may be earned through Health, Nutrition and Exercise Sciences and the School of Education. A graduate minor also is available in several of the preceding units. Doctoral programs are offered by the college are in Human Development and in Education.

The Human Development (Ph.D.) program has an interdisciplinary approach, which allows students to focus on one of three tracks: Wellness, Counseling Education, or Applied Gerontology. The doctoral program in Education (Ph.D. or Ed.D.) has a cross-disciplinary emphasis, which allows students a choice between two tracks: Institutional Analysis and Occupational and Adult Education. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

## Degree Requirements

Students enrolled in major programs in the college are required to follow curriculum guidelines, available in the Dean's Office of the college (255 EML) or department offices, for each of the curriculum options and majors. Course requirements in each program fulfill university, college, and departmental requirements. Refer also to graduation requirements and related information listed earlier in the Academic Policies section.

All undergraduate degree candidates must apply for graduation through the Office of Registration and Records according to university procedures and deadlines.

Courses taken pass/fail will not be used to satisfy any requirements other than total credits. Departments may have additional restrictions. Approval must be obtained and processed during the first three weeks of the

regular semester. Once processed, a course cannot be changed back to regular grading.

MATH 101 and 102 are developmental courses and will not count toward credits for graduation in any program.

General college requirements for the two undergraduate degrees extend beyond the minimum university general education requirements. An advisor should be consulted for specific courses. Students also are encouraged to follow their own interests in choosing electives that go beyond the minimum requirements. Minimum requirements for each degree include the following:

## Bachelor of Science degree

<i>General Education:</i>	<i>Credits</i>
First-year experience . . . . .	1
Communication . . . . .	9*
COMM 110 . . . . .	(3)
ENGL 110, 120 . . . . .	(6)
Quantitative Reasoning . . . . .	3
MATH 104, 146 or higher, CSCI 122, CSCI 125, <b>or</b> STAT 330	
Science & Technology . . . . .	10
A laboratory course must be taken as a corequisite with one course.	
Humanities & Fine Arts . . . . .	6
Social & Behavioral Sciences . . . . .	6
Wellness . . . . .	2

Requirements also include a course in cultural diversity, a course in global perspectives, and integration of the following within existing courses: communication activities in upper-division major courses, comprehension of personal and professional ethics, and a capstone experience.

These courses, professional courses for the major, and electives must total a minimum of 122 credits to meet degree requirements.

\*Effective fall 2007, students entering NDSU will be required to complete an upper-level, writing-intensive course as part of the general education requirements.

## Bachelor of Arts Degree

In addition to all of the preceding requirements listed for the Bachelor of Science degree, Bachelor of Arts degree requirements also include the following:

Six (6) additional credits of humanities and social behavioral sciences

Two years of one modern foreign language at the college level or equivalent

College students with two units/years of a foreign language in high school should enter the second year college-level language course. Students with four or more units/years of a foreign language in high school or college will be considered to have completed the language requirement.

## Curriculum Majors and Options

Apparel and Textiles  
 Apparel Studies Option  
 Athletic Training  
 Child Development and Family Science  
 Child Development Option  
 Community Health Option  
 Dietetics  
 Elementary Education/CDFS Dual  
 Family Science Option  
 Hospitality and Tourism Management  
 Human Performance and Fitness  
 Interior Design  
 Recreation Management Option  
 Retail Merchandising Option  
 School Health Option  
 Sport Management Option  
 Sport and Recreation Studies

### Secondary Education:

Agricultural Education  
 Biological Sciences  
 Chemistry  
 Comprehensive Science Education  
 Earth Science  
 English  
 Family and Consumer Sciences Education  
 French  
 Health Education  
 History  
 Mathematics  
 Music (K-12)  
 Physical Education (K-12)  
 Physics  
 Social Science  
 Spanish

**Elementary Education:** An Elementary Education program is available through the cooperation of Valley City State University, the degree-granting institution for this program. This degree program must be completed concurrently with a CDFS major from NDSU. Upon completion of the Dual Degree Program, the graduate will have earned a Bachelor of Science degree from the College of Human Development and Education with a major in Child Development and Family Science from NDSU and a Bachelor of Science degree in Elementary Education from Valley City State University.

## Minors

A minor is a similar grouping of courses in which the university requires a minimum of 16 credits. (At least eight credits of the minor must be taken at NDSU.) Departments may require more credits for their minors. For the minors to be awarded, students must complete a minor verification form. Information on specific minors may be obtained in the Dean's Office (255 EML). Minors offered in the college are: Individual and Family Wellness; Child Development and Family Science;

Apparel and Textiles; Interior Design; Facility Management; Hospitality and Tourism Management; Health Education; Nutrition; Physical Education; Coaching; and Extension Education.

## Interdisciplinary Programs

The College of Human Development and Education participates in two interdisciplinary programs on campus:

### Gerontology Minor

The Gerontology minor provides students with an integrated understanding of the process of aging, aging services, and the aged in America. For further information, refer to the Interdisciplinary Programs section of this Bulletin.

### Women's Studies Major and Minor

The goal of Women's Studies is to examine the contributions of women to all aspects of society, to explore the intersections of race, class, sexual orientation, age, and physical ability with gender both globally and nationally, to investigate the heritage, challenges and concerns of women, and to provide a newer and broader understanding of women in all fields. For further information, refer to the Interdisciplinary Programs section of this Bulletin.

## Special Opportunities

Special opportunities available to students in the college include the following.

### Professional Organizations

Student chapters of professional organizations are available for membership in accordance with their respective bylaws:

American Association of Family and Consumer Sciences (AAFCS)  
 Aspiring Teachers of Mathematics and Science (ATOMS)  
 American Society of Interior Designers (ASID)  
 Child Development and Family Science Club  
 Eta Sigma Delta (honorary)  
 Fashion, Apparel, and Business Organization (FABO)  
 Hospitality Student Association  
 International Facility Management Association (IFMA)  
 Phi Upsilon Omicron (honorary)  
 Student Dietetic Association (SDA)  
 Student North Dakota Education Association (SNDEA)

Additional information is available from the Student Services Office in the college (255 EML).

### Dean's Student Advisory Council

The Dean's Student Advisory Council acts as a liaison organization between the student body, the faculty, and the Dean of the College of Human Development and Education. The council assists in the promotion of the college. The Director of Student Services and Development recommends the students to the Dean. Their selection is based on academics and a willingness to participate. Student members represent each of the four units in the college.

### Student Advisors

Although each student in the college is assigned a faculty advisor, selected students supplement and complement the existing faculty advisory system. The student advisor program is designed to help incoming and transfer students make the best possible academic and social adjustments to the college and the university.

Applications for student advisors are reviewed and selected each spring. Information is available in the Student Services Office of the college (255 EML).

## Cooperative Education

Cooperative Education, a program of the Career Center, offers undergraduate and graduate students an opportunity to integrate classroom study with paid, career related work experience for academic credit. Work may be full or part time. Credit is granted through Continuing Education and awarded directly by the Cooperative Education program. A Cooperative Education experience may substantially improve students' employment opportunities after graduation.

## Department of Apparel, Design, Facility and Hospitality Management

[www.ndsu.edu/adfbm](http://www.ndsu.edu/adfbm)

Students graduating with majors in Apparel and Textiles, Hospitality and Tourism Management, or Interior Design have a general education and specialized career preparation. Interdisciplinary curricula in the Department of Apparel, Design, Facility and Hospitality Management may build upon economics and business, art, behavioral sciences, or natural sciences. The department offers three majors: Apparel and Textiles, Hospitality and Tourism Management, and Interior Design. Two options are available within Apparel and Textiles: apparel studies and retail merchandising. The retail merchandising option offers two emphasis areas: interior retail merchandising and textile product retail merchandising. There are two options available within Hospitality and Tourism Management: hospitality and tourism management lodging and hospitality and tourism management restaurant management. Minors are available in each program. For more information about any of the programs, contact the department. New students are advised to contact the department prior to beginning their college work.

### Enrichment Opportunities

The department supplements classroom learning through structured field experiences to fashion and design centers. Field trips to Minneapolis, New York City, Kansas City, Chicago, and cities in Europe are scheduled at least biannually; others are scheduled as needed.

Professional enrichment is possible through departmental affiliation with the Fashion Institute of Technology, New York City, or various Study Abroad programs. NDSU students who attend these institutions for a semester or a year gain valuable experience in a fashion, merchandising, hospitality and tourism management, or interior design environment. Students should prepare to do this experience during their junior and/or senior year. Additional information about these programs is furnished upon request.

## Apparel and Textiles Major

Students are prepared for a variety of careers in the apparel and textile industry that range from product conception through distribution to the consumer. The Apparel and Textiles program focuses on both national and international aspects of the apparel and textile industry. This includes product development, manufacturing, quality control, wholesaling, retail merchandising, marketing, and product preservation.

**Note:** Apparel and Textiles transfer courses from other institutions must have grades of C or better to be accepted for the Apparel and Textiles program at NDSU.

**Apparel Studies Option:** Prepares students for careers in theatre costuming, costume curator, fashion journalism, product development, and other aspects of the fashion industry, depending on their focus. Students who choose this option must earn a minor from another department. For example, to pursue a museum position as a costume curator, a minor in Public History should be chosen.

**Retail Merchandising Option:** Prepares students for buying, promotion, and retail or human resource management in retail stores. A minor in Business Administration and a field experience to reinforce classroom instruction are required with this option. Students have flexibility in creating a program focus by selecting one of the following emphasis areas:

**Interior Retail Merchandising Emphasis Area:** Prepares students for career opportunities in retail and wholesale home and office furnishing businesses.

**Textile Product Retail Merchandising Emphasis Area:** Prepares students for introductory management or buying positions in retail.

**Fashion Institute of Technology Affiliation**  
The department has an arrangement with the Fashion Institute of Technology (F.I.T.), New York City, where a qualified student may attend that institution for a semester or a full year as a visiting student. Summer School opportunities are also available. The approved credits earned at F.I.T. will transfer to NDSU and will count toward graduation requirements. Students participating in the one-year visiting student program earn an associate degree from F.I.T.

During the second year of study at NDSU, interested students should consult with their advisors to ensure full consideration of their application for the F.I.T. visiting student program. Application should be made at least one year in advance. Students who participate in this program spend their last year of study attending F.I.T.

**Recommended '06-07 Curriculum Apparel and Textiles Major Apparel Studies Option**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
ADFH 150, Design Fundamentals-Lecture . . . . .	--	1
ADFH 171, Fashion Dynamics . . . . .	.3	--
ADFH 181, Aesthetics/Visual Analysis . . . . .	--	3
HD&E 189, Skills for Academic Success . . . . .	.1	--
ENGL 110, College Composition I . . . . .	.3	--
ENGL 120, College Composition II . . . . .	--	3
PSYC 111, Intro to Psychology <b>or</b>		
SOC 110, Intro to Sociology . . . . .	--	3
CSCI 116, Business Use of Computers <b>or</b>		
CSCI 114, Microcomputer Packages . . . . .	.3-4	--
COMM 110, Fund of Public Speaking . . . . .	--	3
MATH 104, Finite Mathematics <b>or</b>		
MATH 146 or higher . . . . .	--	3
Humanities Elective . . . . .	.3	--
Totals . . . . .	13-14	16

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Second Year</b>		
ADFH 155, Apparel Construction & Fit <b>or</b>		
ADFH 370, Sewn-Prod Manufact & Anal . . . . .	.3	--
ADFH 271, Visual Merchandising & Promo . . . . .	--	3
ADFH 272, Product Development . . . . .	--	3
COMM 216, Intercultural Comm <b>or</b>		
Alternative . . . . .	.3	--
ECON 105, Elements of Economics . . . . .	.3	--
COMM 200, Intro to Media Writing <b>or</b>		
Alternative . . . . .	--	3
Humanities Elective . . . . .	.3	--
Science and Technology, Lab . . . . .	--	3,1
Wellness . . . . .	--	2
Elective . . . . .	.3	--
Totals . . . . .	15	15

<b>Third Year</b>		
ADFH 366, Textiles . . . . .	.3	--
ADFH 367, Textiles Laboratory . . . . .	.1	--
ADFH 310, History of Fashion . . . . .	.3	--
ADFH 385, Global Fashion Econ . . . . .	.3	--
ADFH 491, Seminar (Pre-Internship) . . . . .	.1	--
ADFH Elective . . . . .	.3	--
ADFH Elective . . . . .	--	3
ADFH Elective . . . . .	--	3
Minor Course . . . . .	.3	--
Minor Course . . . . .	--	3
HD&E 320, Professional Issues . . . . .	--	1
Elective . . . . .	--	3
Science and Technology . . . . .	--	3
Totals . . . . .	17	16

<b>Fourth Year</b>		
ADFH 410, Dress in World Cultures . . . . .	.3	--
ADFH 481, A & T Capstone Experience . . . . .	--	3
ADFH 486, Dress & Human Behavior . . . . .	.3	--
Elective . . . . .	.3	--
ADFH Elective . . . . .	--	3
ADFH Elective . . . . .	--	3
Minor Courses . . . . .	--	6
Minor Course . . . . .	.6	--
Totals . . . . .	15	15

**Curriculum Total . . . . . 122**

**Recommended '06-07 Curriculum Apparel and Textiles Major Retail Merchandising Option Interior Merchandising Emphasis**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
ADFH 150, Design Fundamentals-Lecture . . . . .	--	1
ADFH 151, Design Fundamentals-Studio . . . . .	--	3
ADFH 160, Interior Design Fac Mgmt Careers . . . . .	.1	--
ADFH 161, Interior Graphics I . . . . .	--	3
ADFH 171, Fashion Dynamics . . . . .	.3	--
ECON 105, Elements of Economics . . . . .	.3	--
HD&E 189, Skills for Academic Success . . . . .	.1	--
COMM 110, Fund of Public Speaking . . . . .	.3	--
ENGL 110, College Composition I . . . . .	.3	--
ENGL 120, College Composition II . . . . .	--	3
MATH 104, Finite Mathematics . . . . .	.3	--
Elective . . . . .	--	3
Totals . . . . .	14	16

<b>Second Year</b>		
ADFH 250, Interior Environmental Analysis . . . . .	.2	--
ADFH 251, Interior Design I-Studio . . . . .	.2	--
ADFH 271, Visual Merchandising & Promo . . . . .	--	3
ADFH 272, Product Development . . . . .	--	3
Elective . . . . .	.3	--
ACCT 102, Fund of Accounting . . . . .	.3	--
CSCI 116, Business Use of Computers <b>or</b>		
CSCI 114, Microcomputer Packages . . . . .	--	3-4
PSYC 111, Intro to Psychology . . . . .	.3	--
COMM 200, Intro to Media Writing <b>or</b>		
Alternative . . . . .	--	3
Science & Technology . . . . .	--	3
Wellness . . . . .	.2	--
Totals . . . . .	15	15-16

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Third Year</b>		
ADFH 315, History of Interiors I . . . . .	.3	--
ADFH 366, Textiles . . . . .	.3	--
ADFH 367, Textiles Lab . . . . .	.1	--
ADFH 316, History of Interiors II . . . . .	--	3
ADFH 491, Seminar (pre-Intern) . . . . .	.1	--
BUSN 350, Found of Management . . . . .	.3	--
BUSN 360, Found of Marketing . . . . .	--	3
COMM 216, Intercultural Comm <b>or</b>		
Alternate . . . . .	.3	--
HD&E 320, Professional Issues . . . . .	--	1
Humanities Elective . . . . .	.3	--
Humanities Elective . . . . .	--	3
BUSN Elective . . . . .	--	3
Elective . . . . .	--	3
Totals . . . . .	17	16

**Summer**  
ADFH 496, Field Experience . . . . . -- 3-6

<b>Fourth Year</b>		
ADFH 372, Global Retailing . . . . .	.3	--
ADFH 470, Retail Financial Mgt & Control . . . . .	--	4
ADFH 481, Apparel & Textiles Capstone Exp . . . . .	--	3
ADFH Elective . . . . .	1-3	--
BUSN 362, Found of Retailing . . . . .	--	3
BUSN Elective . . . . .	.3	--
BUSN Elective . . . . .	--	3
Science & Technology, Lab . . . . .	3,1	--
STAT 330, Intro Statistics . . . . .	.3	--
Totals . . . . .	13-16	13

**Curriculum Total . . . . . 122**

**Recommended '06-07 Curriculum Apparel and Textiles Major Retail Merchandising Option Textile Product Merchandising Emphasis**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
ADFH 150, Design Fund-Lecture . . . . .	--	1
ADFH 171, Fashion Dynamics . . . . .	.3	--
ADFH 181, Aesthetics/Visual Anals . . . . .	--	3
HD&E 189, Skills for Academic Success . . . . .	.1	--
ENGL 110, College Composition I . . . . .	.3	--
ENGL 120, College Composition II . . . . .	--	3
COMM 110, Fund of Public Speaking . . . . .	.3	--
MATH 104, Finite Mathematics . . . . .	--	3
CSCI 116, Business Use of Computers <b>or</b>		
CSCI 114, Microcomputer Packages . . . . .	--	3-4
Humanities Elective . . . . .	.3	--
Totals . . . . .	13	13-14

**Summer**  
ADFH 196/496, Field Experience (optional) . . . . . -- 1-2

<b>Second Year</b>		
PSYC 111, Intro to Psychology . . . . .	.3	--
ADFH 271, Visual Merchandising & Promo . . . . .	--	3
ADFH 272, Product Development . . . . .	--	3
ENGL 322, Creative Writing I . . . . .	.3	--
ACCT 102, Fund of Accounting . . . . .	.3	--
ECON 105, Elements of Economics . . . . .	--	3
Science & Technology Elective . . . . .	.3	--
Science & Technology, Lab . . . . .	--	3,1
Humanities Elective . . . . .	.3	--
Wellness . . . . .	--	2
Totals . . . . .	15	15

**Summer**  
ADFH 496, Field Experience (optional) . . . . . -- 3-6



		<i>Credits</i>	
		<i>F</i>	<i>S</i>
<b>Third Year</b>			
ADFH 310, History of Fashion	3	--	--
ADFH 366, Textiles	3	--	--
ADFH 367, Textiles Lab	1	--	--
ADFH 370, Sewn-Product Mfg & Analysis	3	--	3
ADFH 372, Global Retailing	3	--	--
ADFH 491, Seminar (pre-Intern)	1	--	--
HD&E 320, Professional Issues	--	1	--
BUSN 350, Found of Management	3	--	--
BUSN 360, Found of Marketing	3	--	--
BUSN 362, Found of Retailing	--	3	--
BUSN Elective	--	3	--
ADFH Elective	--	3	--
Elective	--	3	--
Totals	17	16	

<b>Summer</b>			
ADFH 496, Field Experience	--	3-6	

<b>Fourth Year</b>			
ADFH 385, Global Fashion Economics	3	--	--
ADFH 410, Dress in World Cultures	3	--	--
ADFH 470, Retail Financial Mgr & Control	--	4	--
ADFH 481, Apparel & Textiles Capstone Exp	--	3	--
ADFH 486, Dress & Human Behavior	3	--	--
ADFH Elective	--	3	--
BUSN Elective	3	--	--
BUSN Elective	--	3	--
COMM 216, Intercultural Communication <i>or</i>			
Alternative	--	3	--
STAT 330, Intro Statistics	3	--	--
Totals	15	16	

**Curriculum Total.** 122

### Recommended '06-07 Curriculum Apparel and Textiles Minor Option in Retail Merchandising (Soft Goods Emphasis)

		<i>Credits</i>	
ADFH 171, Fashion Dynamics	3		
ADFH 370, Sewn-Product Mfg & Analysis	3		
ADFH 181, Aesthetics/Visual Analysis	3		
ADFH 366, Textiles	3		
ADFH 372, Global Retailing	3		
ADFH 385, Global Fashion Economics	3		
ADFH 470, Retail Financial Mgr & Control	4		
Totals	22		

### Option in Retail Management (for Business Administration Majors)

ADFH 171, Fashion Dynamics	3		
ADFH 272, Product Development	3		
ADFH 372, Global Retailing	3		
ADFH 470, Retailing Financial Mgr & Control	4		
BUSN 360, Found of Marketing	3		
BUSN 362, Found of Retailing	3		
ADFH Elective	3		

### Option in Apparel Studies

ADFH 155, Apparel Construction & Fit <i>or</i>			
ADFH 370, Sewn-Product Mfg & Analysis	3		
ADFH 171, Fashion Dynamics	3		
ADFH 181, Aesthetic & Visual Analysis	3		
ADFH 366/367, Textiles & Textiles Lab	3,1		
ADFH Electives <sup>1</sup>	6		
ADFH Electives &/or Supporting Course <sup>1</sup>	3		
Totals	22		

<sup>1</sup> With approval of minor advisor

### Hospitality and Tourism Management Major

The essential nature or mission of the Hospitality and Tourism Management (HTM) program at NDSU is to provide quality education and service in hotel and restaurant management to its stakeholders. This is further

defined and accomplished through the threefold mission of the land-grant university.

As the nation's number one employer, the hospitality and tourism industry employs millions of people. The demand for managers has grown and continues to grow as the demand for services grows. Along with this demand for services, is a growing emphasis on comfort, convenience, nutrition, and personalized attention. All of these factors increase the need for effective and efficient professionals to manage hospitality operations and lead teams of people.

In the Hospitality and Tourism Management major, students prepare for a variety of careers in the hospitality industry. Students can choose a curriculum designed to meet their personal interests for career opportunities: lodging management, or restaurant management. Students with the lodging management option are prepared for management positions in hotels and motels, or can choose elective courses to provide an emphasis designed for working in hotels or resorts with large spa facilities. Students with the restaurant management option are prepared for management positions in commercial restaurants, or can choose elective courses to provide an emphasis designed for working in institutional food service operations. Administrative and management positions are available in hotels, resorts, clubs, restaurants, catering facilities, national parks, and college and university food service operations.

Supervised on-the-job experience (internship) is required of all students enrolled in the program. Students are placed in hospitality businesses in the local and regional community, as well as national and international corporations.

**Lodging management emphasis area:** Prepares students for careers in hotels, resorts, casinos, and events management.

**Restaurant management emphasis area:** Prepares students for careers in restaurants and institutional food service.

### Recommended '06-07 Curriculum Hospitality and Tourism Management Major Lodging Management Option

		<i>Credits</i>	
		<i>F</i>	<i>S</i>
<b>First Year</b>			
ENGL 110, College Composition I	3	--	--
ENGL 120, College Composition II	3	--	3
ADFH 140, Intro to Hospitality Industry	3	--	--
ADFH 141, Tourism & Travel Management	3	--	3
HNES 141, Food Sanitation	--	1	--
HD&E 189, Skills for Academic Success	1	--	--
Quantitative Reasoning	--	3	--
ACCT 102, Fund of Accounting	3	--	--
PSYC 111, Intro to Psychology	--	3	--
Elective	--	3	--
Wellness	--	3	--
Totals	13	16	

<b>Second Year</b>			
CSCI 116, Business Use of Computers <i>or</i>			
CSCI 114, Microcomputer Packages	3-4	--	--
CHEM 117, Chemical Concepts/App'l <i>or</i>			
CHEM 121, General Chemistry	3	--	--
ADFH 241, Hospitality Accounting	3	--	--
ECON 105, Elements of Economics	--	3	--
COMM 110, Fund of Public Speaking	--	3	--
HNES 261, Food Selection/Prep Principles	3	--	--
HNES 261L, Food Selection/Prep Lab	2	--	--
Science & Technology	--	3	--
Science & Technology Lab	--	1	--
Humanities & Fine Arts Elective	--	3	--
Elective	--	3	--
Totals	14-15	16	

		<i>Credits</i>	
		<i>F</i>	<i>S</i>
<b>Third Year</b>			
ADFH 360, Front Office Management	--	3	--
ADFH 368, Interior Materials & Maintenance	--	3	--
ADFH 381, Hospitality Marketing & Sales	--	3	--
ADFH 403, Resort & Spa Operations	3	--	--
BUSN 350, Found of Management	3	--	--
BUSN 360, Found of Marketing	3	--	--
Humanities & Fine Arts Elective	3	--	--
HD&E 320, Professional Issues	--	1	--
ADFH 400, Food, Bev Labor Cost Control	3	--	--
ADFH 491, Seminar	1	--	--
ENGL 320, Bus and Prof Communication	--	3	--
BUSN Elective	--	3	--
Totals	16	16	

<b>Summer Session</b>			
ADFH 496, Field Experience	3	--	--

<b>Fourth Year</b>			
Elective	3	--	--
ADFH 467, Hospitality Law	3	--	--
ADFH 384, Beverage Operations	3	--	--
ADFH 479, Hospitality Industry Mgmt Strat	--	3	--
ADFH 401, Convention & Meeting Planning	--	3	--
ADFH 405, Casino Operations	3	--	--
BUSN Electives	3	6	--
Totals	15	12	

**Curriculum Total.** 122

### Recommended '06-07 Curriculum Hospitality and Tourism Management Restaurant Management Option

		<i>Credits</i>	
		<i>F</i>	<i>S</i>
<b>First Year</b>			
ENGL 110, College Composition I	3	--	--
ENGL 120, College Composition II	--	3	--
ADFH 140, Intro to Hospitality Industry	3	--	--
ADFH 141, Tourism & Travel Mgmt.	--	3	--
HNES 141, Food Sanitation	--	1	--
HD&E 189, Skills for Academic Success	1	--	--
Quantitative Reasoning	--	3	--
ACCT 102, Fund of Accounting	3	--	--
PSYC 111, Intro to Psychology	--	3	--
Elective	4	--	--
Wellness	--	3	--
Totals	14	16	

<b>Second Year</b>			
CSCI 116, Business Use of Computers <i>or</i>			
CSCI 114, Microcomputer Packages	3-4	--	--
CHEM 117, Chemical Concepts/App'l <i>or</i>			
CHEM 121, General Chemistry	3	--	--
ADFH 241, Hospitality Accounting	3	--	--
ECON 105, Elements of Economics	--	3	--
COMM 110, Fund of Public Speaking	--	3	--
HNES 261, Food Selection/Prep Prin	3	--	--
HNES 261L, Food Selection/Prep Lab	2	--	--
Science & Technology	--	3	--
Science & Technology Lab	--	1	--
Humanities & Fine Arts Elective	--	3	--
Elective	--	3	--
Totals	14-15	16	

<b>Third Year</b>			
ADFH 381, Hospitality Marketing & Sales	--	3	--
HNES 361, Food Production Mgmt	--	3	--
HNES 361L, Food Production Mgmt Lab	--	2	--
BUSN 350, Fund of Mgmt	3	--	--
BUSN 360, Fund of Marketing	3	--	--
Humanities & Fine Arts Elective	3	--	--
ENGL 320 Bus & Prof Communication	--	3	--
HD&E 320, Professional Issues	--	1	--
BUSN Elective	3	3	--
Elective	3	--	--
ADFH 491, Seminar	1	--	--
Totals	16	15	

<b>Summer Session</b>	<b>Credits</b>
ADFH 496, Field Experience . . . . .	-- 3

<b>Fourth Year</b>	<b>F</b>	<b>S</b>
ADFH 467, Hospitality Law . . . . .	3	--
ADFH 384, Beverage Operations . . . . .	3	--
ADFH 400, Food, Bev, Labor Cost Control . . . . .	3	--
ADFH 479, Hospitality Industry Mgmt Strat . . . . .	--	3
ADFH 402, Professional Catering Mgmt . . . . .	3	--
ADFH 404, Restaurant Operations Mgmt . . . . .	3	--
HNES 460, Foodservice Systems . . . . .	3	--
BUSN Electives . . . . .	--	6
Totals . . . . .	15	15

**Curriculum Total . . . . . 122**

**Recommended '06-07 Curriculum Hospitality and Tourism Management Minor**

	<b>Credits</b>
ADFH 140, Intro to Hospitality Industry . . . . .	3
ADFH 141, Tourism & Travel Management . . . . .	3
ADFH 241, Hospitality Accounting . . . . .	3
ADFH 491, Seminar . . . . .	1

**Choose 9 credits from the following: . . . . . 9**

ADFH 360, Front Office Management (3)	
ADFH 381, Hospitality Marketing & Sales (3)	
ADFH 384, Beverage Operations (3)	
ADFH 400, Food, Beverage, & Labor Cost Control (3)	
ADFH 401, Convention & Meeting Planning (3)	
ADFH 402, Professional Catering Mgmt (3)	
ADFH 403, Resort & Spa Operations (3)	
ADFH 404, Restaurant Operations Mgmt (3)	
ADFH 405, Casino Operations (3)	
ADFH 467, Hospitality Law (3)	
ADFH 496, Study Tour (1-3)	
Total . . . . .	19

**Interior Design Major**

The course of study in Interior Design leads to a first professional interior design degree. Students gain knowledge and experience in identifying, researching, and designing projects relative to the function and quality of man's proximate environment. Courses in design fundamentals, design analysis, space planning, interior construction, building systems and equipment, and technical communication prepare students to successfully complete studio projects in residential and commercial design (e.g., institutional, educational, hospitality, corporate, retail, health care).

Students learn several approaches to the design process, but all involve: analyzing client needs, goals, and life safety requirements; design concept development; developing and presenting design recommendations; and working drawings and specifications in compliance with universal accessibility guidelines and all applicable codes.

Students participate in an internship during the summer between their third and fourth years. This internship may or may not include a stipend to support that student while living away from campus or home.

The Interior Design major has four years of sequenced studio work. Enrollment in sophomore level interior design courses requires a 3.0 institutional cumulative grade-point average. Admission into the third-year studio is based upon demonstrated professional interest, a portfolio review completed during the spring semester of the student's sophomore year, a 3.0 institutional cumulative grade-point average, and a minimum grade of C in all major core requirements. All students successfully completing sophomore review are required to purchase a laptop computer for upper division studio courses. Senior Interior Design students complete a capstone course that culminates the professional design educational experience.

The Interior Design program is accredited by the Council for Interior Design Accreditation.

**Recommended '06-07 Curriculum Interior Design Major**

	<b>Credits</b>	
<b>First Year</b>	<b>F</b>	<b>S</b>
ADFH 150, Design Fund Lecture . . . . .	1	--
ADFH 151, Design Fund Studio . . . . .	3	--
ADFH 160, Interior Design Careers . . . . .	1	--
ADFH 161, Interior Graphics I . . . . .	--	3
COMM 110, Fund of Public Speaking . . . . .	--	3
CSCI 116, Business Use of Computers <b>or</b>		
CSCI 114, Microcomputer Packages . . . . .	3-4	--
ENGL 110, College Composition I . . . . .	3	--
ENGL 120, College Composition II . . . . .	--	3
HD&E 189, Skills for Academic Success . . . . .	1	--
MATH 104, Finite Mathematics . . . . .	--	3
Social & Behavioral Science . . . . .	3	--
Supporting Course . . . . .	--	3
Totals . . . . .	15-16	15

<b>Second Year</b>		
ADFH 250, Interior Environmental Analysis . . . . .	2	--
ADFH 251, Interior Design Studio I: Residential . . . . .	2	--
ADFH 253, Interior Design II: Office Design . . . . .	2	--
ADFH 254, Interior Design III: SS Contract . . . . .	2	--
ADFH 261, Interior Design Graphics II . . . . .	3	--
ADFH 263, Construction Methods & Technology . . . . .	3	--
ADFH 264, Residential Systems . . . . .	2	--
ART 210 or 211, Art History I <b>or</b>		
Art History II . . . . .	3	--
Science & Technology Elective . . . . .	--	3
Science & Technology Laboratory . . . . .	--	1
Social & Behavioral Science . . . . .	--	3
Wellness . . . . .	--	2
Totals . . . . .	15	13

<b>Summer Session</b>		
ADFH 365, CADD for Interiors . . . . .	--	3

<b>Third Year</b>		
ADFH 315, History of Interiors I . . . . .	3	--
ADFH 316, History of Interiors II . . . . .	--	3
ADFH 351, Interior Design Studio		
IV: Adv. Residential . . . . .	3	--
ADFH 353, Interior Design Studio		
V: L Scale Contract . . . . .	--	3
ADFH 362, Codes for Interiors . . . . .	2	--
ADFH 363, Comm. Lighting Design		
& Building Systems . . . . .	3	--
ADFH 366, Textiles . . . . .	3	--
ADFH 367, Textiles Lab . . . . .	1	--
ADFH 368, Interior Materials & Maintenance . . . . .	--	3
ADFH 460, Career Development & Prof Practice . . . . .	--	3
ADFH 491, Seminar . . . . .	1	--
HD&E 320, Professional Issues . . . . .	--	1
Science & Technology Elective . . . . .	--	3
Totals . . . . .	16	16

<b>Summer Session</b>		
ADFH 496, Field Experience . . . . .	--	3

<b>Fourth Year</b>		
ADFH 300, Design Resource Mgmt . . . . .	1-3	--
ADFH 450, Research & Project Dev in ID . . . . .	3	--
ADFH 452, Compr Int Design Project (CAP) . . . . .	--	6
ADFH 491, Seminar . . . . .	1	--
Supporting Courses . . . . .	3	--
Electives . . . . .	6	--
Totals . . . . .	14	12

**Curriculum Total . . . . . 122**

**Recommended '06-07 Curriculum Interior Design Minor**

	<b>Credits</b>
ADFH 150, Design Fundamentals Lecture . . . . .	1
ADFH 151, Design Fundamentals Studio . . . . .	3
ADFH 160, Interior Design Careers . . . . .	1
ADFH 161, Interior Graphics I . . . . .	3
ADFH 250, Interior Environmental Analysis . . . . .	2

	<b>Credits</b>
ADFH 251, Interior Design Studio I: Residential <b>or</b> . . . . .	2
ADFH 253, Interior Design Studio II: Office Design <b>or</b>	
ADFH 254, Interior Design Studio III: Small Scale Contract	
ADFH 264, Residential Systems . . . . .	2
ADFH 315, History of Interiors I . . . . .	3
ADFH 316, History of Interiors II . . . . .	3
Total . . . . .	20

**Interior Design Minor - Architecture Majors Only**

ADFH 160, Interior Design Careers . . . . .	1
ADFH 250, Interior Environmental Analysis . . . . .	2
ADFH 251, Interior Design Studio I: Residential <b>or</b> . . . . .	2
ADFH 253, Interior Design Studio II: Office Design <b>or</b>	
ADFH 254, Interior Design Studio III: Small Scale Contract	
ADFH 315, History of Interiors I . . . . .	3
ADFH 316, History of Interiors II . . . . .	3
ADFH Electives <sup>1</sup> . . . . .	12
Total . . . . .	23

<sup>1</sup> Choose additional credits from ADFH 251, 253, 254, 261, 263, 264, 300, 362, 363, 365, 368, 491.

**Department of Child Development and Family Science**

[www.ndsu.edu/cdfs](http://www.ndsu.edu/cdfs)

The mission of the Department of Child Development and Family Science (CDFS) is to provide a comprehensive, integrated knowledge of families and individuals across the life span that will equip students for careers in the helping professions and to enter graduate programs. The curriculum emphasizes practical application, acknowledging individuals and families as developing and changing entities within a larger societal context.

**Child Development and Family Science Major**

At the undergraduate level, the department offers a curriculum leading to a Bachelor of Science degree through three options: child development, family science, and child development/elementary education. Child Development and Family Science majors are prepared to work in a variety of areas related to children and families. Employment opportunities include parent and family life educators, extension agents, child protection service professionals, financial counselors, nursing home activity directors, credit specialists, probation agents, directors of child care licensing, and hospital child life specialists.

Course work provides students with an ecological approach to the study of human development and families with emphasis on the interactions of individuals, families, and the broader environmental context. Allowing students to select electives within the department to specialize in careers of interest provides flexibility.

**CDFS Core:** CDFS majors are required to complete the following set of common core courses

	<b>Credits</b>
CDFS 135, Family Science . . . . .	3
CDFS 353, Children, Families, & Public Policy . . . . .	3
CDFS 403, Intro to Research Methods in CDFS . . . . .	3
CDFS 485, Capstone Experience <b>or</b>	
CDFS 491, Seminar: Senior Thesis . . . . .	3

A field experience is required for both options. All students are given the opportunity to work in a professional placement during their undergraduate program. This requirement enables students to apply their course

work to a professional position as they prepare to move into important careers with children and families.

**Note:** Transfer credits in child development and family science from other institutions must have grades of C or better to be accepted for the Child Development and Family Science program at NDSU.

**Child Development Option:** This option prepares students for careers involving direct and support services for children and adolescents.

**Child Development option requirements**

<i>All of the following:</i>	<i>Credits</i>
CDFS Core	12
CDFS 320, Prenatal, Infant/Toddler Development	3
CDFS 330, Child Development	3
CDFS 341, Parent-Child Relations	3
CDFS 424, Observation & Assessment of Children	3
CDFS 425, Risk, Resilience, & Competence in Children and Adolescents	3
CDFS 450, Adolescent Development	3
CDFS 460, Adult Development & Aging	3
CDFS 475, Children & Family Across Cultures	3
CDFS 488, Exceptional Child & Family	3
CDFS 496, Field Experience	8
CDFS Electives	9
Total	56

**Family Science Option:** This option allows students to take a concentration of courses in human development, family science, or family economics in preparation for careers in direct and support services for families.

**Family Science option requirements**

<i>All of the following:</i>	<i>Credits</i>
CDFS Core	12
CDFS 230, Life Span Development	3
CDFS 357, Personal & Family Finance	3
CDFS 496, Field Experience	8
CDFS Electives	12

**And six credits from the following family science courses:**

CDFS 341, Parent-Child Relations	3
CDFS 448, Issues in Sexuality	3
CDFS 462, Risk, Resilience, & Competence in Families	3
CDFS 475, Children/Families Across Cultures	3
CDFS 482, Family Dynamics of Aging	3

**And six credits from the following human development courses:**

CDFS 320, Prenatal, Infant & Toddler Development	3
CDFS 330, Child Development	3
CDFS 450, Adolescent Development	3
CDFS 460, Adult Development & Aging	3

**And six credits from the following family economics courses:**

CDFS 186, Consumer & Society	3
CDFS 468, Families & Work	3
CDFS 477, Financial Counseling	3
Total	53

**Recommended '06-07 Curriculum Child Development Family Science**

	<i>Option</i>	
	<i>Child Devel.</i>	<i>Fam. Sci.</i>
<b>First Year</b>		
CDFS 135, Family Science	3	3
CDFS 230, Life Span Development	3	3
Elective	3	9
COMM 110, Fund of Public Speaking	3	3
ENGL 110, College Composition I	3	3
ENGL 120, College Composition II	3	3

	<i>Option</i>	
	<i>Child Devel.</i>	<i>Fam. Sci.</i>
HD&E 189, Skills for Academic Success	1	1
PSYC 111, Intro to Psychology	3	3
CDFS Electives	6	--
CDFS Core	--	3
Wellness	2-3	--
Totals	27-28	31

**Second Year**

CDFS 320, Prenatal, Infant & Toddler Dev	3	--
CDFS 330, Child Development	3	--
CSCI 116, Business Use of Computers <b>or</b>		
CSCI 114, Microcomputer Packages	3-4	3-4
SOC 110, Intro to Sociology	3	3
CDFS Core	--	12
CDFS Electives	--	3
Humanities & Fine Arts Elective	3	3
Quantitative Reasoning	3	3
Science and Technology w/Lab	3,1	3,1
Science & Technology	3	--
Electives	6	--
Totals	31-32	31-32

**Third Year**

CDFS 341, Parent-Child Relations	3	--
CDFS 353, Children, Family/Public Policy	3	3
CDFS 357, Personal & Family Finance	--	3
CDFS 425, Risk, Resilience, & Competence in Children & Adolescents	3	--
CDFS 403, Research Methods in CDFS	3	3
CDFS 450, Adolescent Development	3	--
CDFS 475, Children/Fam Across Cultures	3	--
HD&E 320, Professional Issues	1	1
CDFS Electives	3	9
Humanities & Fine Arts Electives	3	3
Science & Technology Elective	--	3
Wellness	--	2-3
Electives	9	6
Totals	34	33-34

**Fourth Year**

CDFS 424, Observ & Assess of Children	3	--
CDFS 460, Adult Development & Aging	3	--
CDFS 485, Capstone Experience <b>or</b>		
CDFS 491, Seminar: Sr. Thesis	3	3
CDFS Core	--	3
CDFS 496, Field Experience	8	8
CDFS 488, Exceptional Child/Family	3	--
Elective	10	13
Totals	30	27

**Curriculum Totals . . . . .122 122**

**CDFS/Elementary Education Dual Degree Program**

The Child Development/Elementary Education option is a collaborative effort between NDSU and Valley City State University. Through this curriculum, offered on the NDSU campus, students are concurrently enrolled in both universities, culminating in a bachelor's degree from NDSU in Child Development and Family Science (Child Development option) as well as a bachelor's degree from VCSU in Elementary Education. Students are certified to teach Elementary Education in public schools and may, with additional course work and an additional student teaching experience, be certified to teach kindergarten as well. The CDFS degree complements and strengthens the Elementary Education curriculum and helps future teachers understand development and its diversity, making them more effective teachers and helping them work with children from a wide variety of backgrounds.

**Recommended '06-07 Curriculum Child Development/Elementary Education**

<i>First Year</i>	<i>Credits</i>
CDFS 135, Family Science	3
PSYC 111, Intro to Psychology	3
ENGL 110, College Composition I	3
HIST 103, U.S. to 1877 <b>or</b>	
HIST 104, US. Since 1877	3
HD&E 189, Skills for Academic Success	1
HPER 100, Concepts/Fitness & Wellness	2
COMM 110, Fund of Public Speaking	3
ENGL 120, College Composition II	3
CSCI 114, Microcomputer Packages <b>or</b>	
CSCI 116, Business Use of Computers	3 or 4
HUM - Area 1	3
BIO/CHEM/PHYSICS/GEOL	3
Math 103, College Algebra	3
Total	33-34

**Second Year**

CDFS 320, Prenatal, Infant & Toddler Development	3
CDFS 341, Parent-Child Relations	3
BIO/CHEM/PHYSICS/GEOL + LAB	4
PSYC 250, Developmental Psychology	3
HUM - Area 2	3
CDFS 330, Child Development	3
CDFS 353, Children, Families & Public Policy	3
BIO/CHEM/PHYSICS/GEOL	3
EDUC 489, Native Americans & Multicultural Instructional Practices	3
Directed Elective	3
Total	31

**Third Year**

CDFS 424, Observation & Assessment of Children	3
EDUC 200, Intro to Elementary Education	3
EDUC 300, Educational Technology	2
EDUC 320, Social Studies/Elementary School	3
MATH 277, Math for Elementary Teachers I	3
CDFS 425, Risk, Resilience & Competence in Children & Adolescents	3
HD&E 320, Professional Issues	1
EDUC 240, Educ Exceptional Students	2
EDUC 315, Math in the Elementary School	2
EDUC 321, Foundations of Reading Instruction	3
EDUC 330, Children's Literature	3
MATH 278, Math for Elementary Teachers II	2
Total	30

**Summer After Third Year**

EDUC 210, Creative Activities	2
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**Fourth Year**

CDFS 475, Children & Families Across Cultures	3
EDUC 322, Meth & Mat of Lang Arts Inst I	3
EDUC 323, Meth & Mat of Lang Arts Inst II	2
EDUC 350, Elementary School Practicum	2
EDUC 355, Science Methods/Elementary Teachers	3
Directed Elective	3
PSYC 430, Educational Psychology	2
EDUC 423, VCSU Ed 450/Curr Iss/Trads/EDU	2
EDUC 488, Applied Student Teaching	10
Total	30

**CDFS Minor**

The Child Development and Family Science minor is especially appropriate for students majoring in the social or behavioral sciences and other students planning careers that involve work with people. The 18-credit minor consists of CDFS 135, 230, and 12 credits of CDFS electives. At least nine credits must be upper division, and no more than three credits may be in field experience, practicum, or student teaching. Some CDFS courses also apply to interdisciplinary minors in Women's Studies and Gerontology.

**Family Therapy Center:** The Family Therapy Center is located on the NDSU campus. The center is an accredited training program administered through the Department of Child Development and Family Science at NDSU. NDSU faculty members who are clinical members and approved supervisors of the American Association for Marriage and Family Therapy supervise advanced clinical students.

**Center for Child Development:** The CCD is a laboratory school, accredited by the National Academy of Early Childhood Programs, which provides opportunities for NDSU students to observe, do research, and participate in a high quality program for young children and their families.

## Department of Health, Nutrition and Exercise Science

[www.ndsu.edu/HNES](http://www.ndsu.edu/HNES)

This department offers all students an opportunity to develop skills and knowledge that are vital in developing a personal, lifetime wellness concept and to serve as teachers, leaders, and administrators of health, physical education, recreation, athletic training, and dietetics. Majors are available in Athletic Training, Dietetics, Health Education, Human Performance and Fitness, Physical Education, and Recreation Management. Minors offered are Coaching, Nutrition, Health Education, Physical Education, and Food Science.

### Athletic Training Major

The Athletic Training major is a four-year program accredited by the Commission on Accreditation of Athletic Training Education (CAATE). Students have opportunities to apply classroom learning to actual situations by taking an active role in the prevention, recognition, and management of athletic related injuries in their clinical experiences. This format provides continuity through the introduction of knowledge and skills and the reinforcement of those objectives in the clinical (athletic training room) setting. There are two phases to the Athletic Training program: the pre-professional phase (first year) and professional phase (second, third, and fourth year).

**Pre-Professional Phase (must be completed in first year):** During the pre-professional phase of the program the student is required to meet the following standards:

#### The minimum standards:

- The following courses must be taken and a letter grade of B or better earned:  
HNES 180 Athletic Trainers Profession  
HNES 181 Practical Application of Protective Devices and Taping  
HPER 210 First Aid/CPR  
HNES 111 Wellness  
HNES 260 Medical Terminology  
HNES 491 Seminar in Athletic Training Anatomy.
- An overall grade-point average of 2.75 on a 4.0 scale;
- Successful completion of 27 semester credit hours;
- Thirty hours of observation.

#### Professional Phase:

In order for a student to move from the pre-professional phase to the professional phase they must apply to the program and meet the following list of requirements:

- Meet the four minimum standards listed above,
- Submit application, two letters of recommendation, essay,
- Complete formal interview with certified athletic trainers.

The Athletic Training student is conditionally accepted into the program pending the outcome of requirements 1-3. Once conditional acceptance is granted, the following requirements must be completed to receive full program admission:

- A physical exam signed by physician,
- Complete Technical Standards Form signed by a physician,
- Criminal background check,
- Signed compliance/consent form,
- TB test, Hepatitis B vaccine

Once a student has been formally accepted into the professional phase of the Athletic Training program they will be exposed to both academic course work and clinical experiences. The course work is sequenced to enhance and build on the knowledge and skills that are crucial for a student to take the BOC certification exam. The clinical experiences, under the direct supervision of a certified athletic trainer, help the student to further develop and enhance their skills and techniques. The student will have a variety of clinical experiences in the community of Fargo-Moorhead. Some of these include NDSU athletic training room, Concordia College athletic training room, Minnesota State University, Moorhead athletic training room, Fargo North and South High Schools, West Fargo High School, Oak Grove High School, Dakota Clinic/Innovis, MeritCare Health Systems, Red River Valley Sports Medicine, and Orthopedic Associates.

#### ATEP Retention Standards:

Student must meet all of the retention standards (per year) in order to maintain their status in the NDSU Athletic Training Education Program.

#### Second Year Students

- A Passing grade must be earned in BIOL 220/220L Human Anatomy and Physiology by the end of spring semester of your second year in order to remain in the Athletic Training program.
- A letter grade of "C" or better must be earned in BIOL 221/221L Human Anatomy and Physiology by the end of spring semester of your second year in order to remain in the Athletic Training program.
- Must receive a "B" or higher in all Athletic Training curriculum and clinical courses.
- Maintain an overall grade point average of 2.75 on a 4.0 scale.
- Meeting technical standards criteria.
- Displays appropriate ethical/moral conduct or behaviors as stated on the ATS Disposition Form, ATS Student Code of Conduct, NDSU Code of Student Behavior and NATA Code of Ethics.

#### Third And Fourth Year Students

- Must receive a "B" or higher in all Athletic Training curriculum and clinical courses.
- Maintain overall grade point average of 2.75 on 4.0 scale.
- Meet Technical Standards criteria.
- Displays appropriate ethical/moral conduct or behavior as stated on the ATS Disposition Form, ATS Student Code of Conduct, NDSU Code of Student Behavior and NATA Code of Ethics.

Students will only be accepted into the program during fall semester. Transfer students must meet all the minimum requirements before being accepted into the program.

The final objective of the program is set for the student's final semester in the program. The student will take the Board of Certification (BOC) exam. The successful completion of a major in Athletic Training and BOC exam provides career opportunities in high schools, colleges/universities, professional sports, sports medicine clinical settings, industrial settings and corporate fitness settings.

## Recommended '06-07 Curriculum Athletic Training

	<b>F</b>	<b>S</b>	<b>Credits</b>
<b>Observational Phase - First Year</b>			
HNES 110, Intro to HPER	1	--	--
HNES 180, Athletic Trainers Profession	2	--	--
HPER 210, First Aid/CPR	2	--	--
HD&E 189, Skills for Academic Success	1	--	--
ENGL 110, College Composition I	3	--	--
BIOL 220, Human Anatomy & Physiology I	3	--	--
BIOL 220L, Human Anat & Physiology I Lab	1	--	--
MATH 103, College Algebra	<b>or</b>		
MATH 104, Finite Mathematics	3	--	--
HNES 260 Medical Terminology	--	1	1
HNES 181, Taping/Devices/Equipment	--	3	3
HPER 217, Personal/Community Health	--	3	3
BIOL 221, Human Anatomy & Physiology II	--	3	3
BIOL 221L, Human Anat & Physiology II Lab	--	1	1
ENGL 120, College Composition II	--	3	3
HNES 491 Seminar in AT Anatomy	--	3	3
Totals	16	17	17

#### Curriculum Phase - Second Year

COMM 110, Public Speaking	3	--	--
CHEM 117, Chemical Concepts & Applications	3	--	--
HNES 240, Emergency Response	3	--	--
HNES 281, Injury Recog & Eval of Lower Extremity	3	--	--
HNES 284, Clinical Experience I	1	--	--
PHYS 120, Fund of Physics	--	3	3
PSYC 111, Intro to Psychology	--	3	3
PHAR 170, Common Medicine & Diseases	--	2	2
HNES 285, Clinical Experience II	--	1	1
HNES 381, Injury Recog & Eval of Upper Extremity	--	3	3
Humanities Elective (Global)	--	3	3
Elective	3	--	--
Totals	16	15	15

#### Curriculum Phase - Third Year

Humanities (Cultural Diversity)	3	--	--
HNES 271, Tech of Strength & Cond	--	3	3
HNES 365, Kinesiology	3	--	--
HNES 382, Inj Recognition & Evaluation of Head, Neck & Back	3	--	--
HNES 484, Therapeutic Exercise	3	--	--
HNES 386, Clinical Experience III	1	--	--
HNES 485, Therapeutic Modalities	--	3	3
HNES 387, Clinical Experience IV	--	1	1
HNES 465, Physiology of Exercise	--	3	3
HNES 466, Physiology Exercise Lab	--	1	1
HNES 368, Biomechanics of Exer	--	3	3
Elective	3	--	--
Totals	16	14	14

#### Curriculum Phase - Fourth Year

HNES 496, FE/Fall Camp Hours	1	--	--
HNES 487, Admin Athletic Training Program	3	--	--
HNES 488, Clinical Experience V	1	--	--
STAT 330, Intro Statistics	3	--	--
Electives	6	4	4
HNES 455, Sports Nutrition	--	3	3
HNES 486, Medical Aspects of Athletic Training	--	3	3
HNES 489, Athletic Training Capstone	--	1	1
Social/Behavioral Sci (PSYC 212)	--	3	3
Totals	14	14	14

**Curriculum Total** 122

## Dietetics Major

There are two options within the Dietetics major: (a) Coordinated Program and (b) Didactic Program. Both programs include all didactic courses required for membership in The American Dietetic Association.

Students with a major in Dietetics are employed in many settings such as hospitals, clinics, community health programs, businesses, industries, school food services, and as consultants in homes for the elderly and other service institutions. Research and development

opportunities are available in industry, government, and universities; in regulation of food quality through government agencies; and within companies as communication specialists.

**Note:** Transfer credits in dietetics or food and nutrition from other institutions must have grades of C or better to be accepted for the Dietetics program at NDSU.

**Coordinated Program in Dietetics (CPD) Option:** This option prepares professional dietetic practitioners for work in entry-level positions in hospitals, nursing homes, out-patient clinics, businesses, and community agencies.

Acceptance into CPD is competitive and enrollment is limited. Students who have completed the prerequisite courses apply for admission in February. The American Dietetic Association/Council on Education Accreditation/Approval for Dietetic Education accredits the CPD. Graduates are eligible to take the registration exam for dietitians upon completion of the program.

**Didactic Program in Dietetics (DPD) Option:** This option meets the requirements for entrance into an accredited dietetic internship and prepares graduates for internships in hospitals, as well as in health care related organizations. The American Dietetic Association/Council of Accreditation/Approval approves the DPD, a specialized body recognized by the United States Department of Education.

**Recommended '06-07 Curriculum Dietetics Coordinated Program in Dietetics (CPD)**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
ANTH 111, Intro to Anthropology . . . . .	3	--
CHEM 121, General Chemistry I . . . . .	3	--
CHEM 121L, General Chemistry I Lab. . . . .	1	--
CHEM 122, General Chemistry II . . . . .	3	--
CHEM 122L, General Chemistry II Lab . . . . .	1	--
ECON 105, Elements of Economics . . . . .	3	--
ENGL 110, College Composition I . . . . .	3	--
ENGL 120, College Composition II . . . . .	3	--
HD&E 189, Skills for Academic Success . . . . .	1	--
MATH 104, Finite Mathematics <b>or</b>		
MATH 103, College Algebra . . . . .	3	--
PSYC 111, Intro to Psychology . . . . .	3	--
HNES 141, Food Sanitation . . . . .	1	--
Humanities & Fine Arts Elective . . . . .	3	--
Totals . . . . .	14	17

<b>Second Year</b>		
BIOL 202, Intro to Microbiology . . . . .	2	--
BIOL 202L, Intro to Microbiology Lab . . . . .	1	--
BIOC 260, Elements of Biochemistry . . . . .	4	--
CHEM 240, Survey of Organic Chemistry . . . . .	3	--
COMM 110, Fund of Public Speaking . . . . .	3	--
CSCI 116, Business Use of Computers <b>or</b>		
CSCI 114, Microcomputer Packages . . . . .	3-4	--
HNES 250, Nutrition Science . . . . .	3	--
HNES 251, Nutrition, Growth & Development . . . . .	3	--
HNES 261, Food Selection & Preparation . . . . .	3	--
HNES 261L, Food Selection & Prep Lab. . . . .	2	--
BIOL 221, Human Anat & Physiology II . . . . .	3	--
BIOL 221L, Human Anat & Physiology II Lab . . . . .	1	--
HNES 291, Intro to Dietetics . . . . .	1	--
Totals . . . . .	15	17-18

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Third Year</b>		
VETS 115, Medical Terminology <b>or</b>		
HNES 260, AT Medical Terminology . . . . .	1	--
BUSN 350, Found of Management . . . . .	3	--
HNES 351, Metabolic Basis of Nutrition. . . . .	4	--
HNES 354, Intro to Med Nutrition Therapy . . . . .	4	--
HNES 354L, Intro to Med Nutrition Therapy Lab. . . . .	2	--
HNES 361, Food Production Mgr. . . . .	3	--
HNES 361L, Food Production Mgt Lab . . . . .	2	--
HNES 442, Comm Health & Nutrition Ed. . . . .	3	--
HNES 442L, Comm Health & Nutrition Ed Lab . . . . .	1	--
HD&E 320, Professional Issues . . . . .	1	--
STAT 330, Intro Statistics . . . . .	3	--
Humanities, . . . . .	3	--
Electives, . . . . .	1	--
Totals . . . . .	15	16

<b>Fourth Year</b>		
HNES 458, Adv Med Nutrition Therapy . . . . .	4	--
HNES 458L, Adv Med Nutrition Therapy Lab . . . . .	3	--
HNES 460, Foodservice Systems . . . . .	3	--
HNES 460L, Foodservice Systems Lab. . . . .	3	--
HNES 480, Dietetics Practicum. . . . .	12	--
Electives . . . . .	3	--
Totals . . . . .	16	12
<b>Curriculum Total.</b> . . . . .	<b>122</b>	

**Recommended '06-07 Curriculum Dietetics Didactic Program in Dietetics (DPD)**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
ANTH 111, Intro to Anthropology . . . . .	3	--
CHEM 121, General Chemistry I . . . . .	3	--
CHEM 121L, General Chemistry I Lab. . . . .	1	--
CHEM 122, General Chemistry II . . . . .	3	--
CHEM 122L, General Chemistry II Lab . . . . .	1	--
ECON 105, Elements of Economics . . . . .	3	--
ENGL 110, College Composition I . . . . .	3	--
ENGL 120, College Composition II . . . . .	3	--
HD&E 189, Skills for Academic Success . . . . .	1	--
MATH 104, Finite Mathematics <b>or</b>		
MATH 103, College Algebra . . . . .	3	--
PSYC 111, Intro to Psychology . . . . .	3	--
HNES 141, Food Sanitation . . . . .	1	--
Humanities, . . . . .	3	--
Totals . . . . .	14	17

<b>Second Year</b>		
BIOC 260, Elements of Biochemistry . . . . .	4	--
BIOL 202, Intro to Microbiology . . . . .	2	--
BIOL 202L, Intro to Microbiology Lab . . . . .	1	--
CHEM 240, Survey of Organic Chemistry . . . . .	3	--
COMM 110, Fund of Public Speaking . . . . .	3	--
CSCI 116, Business Use of Computers <b>or</b>		
CSCI 114, Microcomputer Packages . . . . .	3-4	--
HNES 250, Nutrition Science . . . . .	3	--
HNES 251, Nutrition, Growth & Development . . . . .	3	--
HNES 261, Food Selection & Prep . . . . .	3	--
HNES 261L, Food Selection & Prep Lab. . . . .	2	--
BIOL 221, Human Anat & Physiology II . . . . .	3	--
BIOL 221L, Human Anat & Physiology II Lab . . . . .	1	--
HNES 291, Intro to Dietetics . . . . .	1	--
Totals . . . . .	15	17-18

<b>Third Year</b>		
VETS 115, Medical Terminology <b>or</b>		
HNES 260, AT Medical Terminology . . . . .	1	--
BUSN 350, Found of Management . . . . .	3	--
HNES 351, Metabolic Basis of Nutrition. . . . .	4	--
HNES 354, Intro/Medical Nutrition Therapy . . . . .	4	--
HNES 361, Food Production Mgr. . . . .	3	--
HNES 361L, Food Production Mgt Lab . . . . .	2	--
HNES 442, Comm Health & Nutrition Ed. . . . .	3	--
HNES 442L, Comm Health & Nutrition Ed Lab . . . . .	1	--
HD&E 320, Professional Issues . . . . .	1	--
STAT 330, Intro Statistics . . . . .	3	--
Humanities, . . . . .	3	--
Electives, . . . . .	1	--
Totals . . . . .	15	16

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Fourth Year</b>		
HNES 458, Adv Medical Nutrition Therapy . . . . .	4	--
HNES 460, Foodservice Systems . . . . .	3	--
HNES 481, Didactic Capstone . . . . .	--	2
HNES 491, Seminar, Dietetic Intern Applic . . . . .	1	--
Electives . . . . .	6	12
Totals . . . . .	14	14
<b>Curriculum Total.</b> . . . . .	<b>122</b>	

**Recommended '06-07 Curriculum Food Service Minor**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
HNES 141, Food Sanitation . . . . .	1	--
HNES 261, Food Selection & Prep Princ. . . . .	3	--
[Prereq: Chem 117 or 121]		
HNES 261L, Food Selection & Prep Princ Lab . . . . .	2	--
HNES 361, Food Production Mgt. . . . .	3	--
HNES 361L, Food Production Mgt Lab . . . . .	2	--
Nutr 240, Principles of Nutrition <b>or</b>		
HNES 250, Nutrition Sci		
[Prereq: CHEM 117 or 121] . . . . .	3	--
HNES 460, Foodservice Systems . . . . .	3	--
<b>Curriculum Total.</b> . . . . .	<b>17</b>	

**Recommended '06-07 Curriculum Nutrition Minor**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
HNES 250, Nutrition Sci [Prereq: CHEM 117-121]. . . . .	3	--
HNES 251, Nutrition, Growth, & Development. . . . .	3	--
HNES 351, Metabolic Basis of Nutrition. . . . .	4	--
[Prereq: CHEM 240, BIOC 260]		
HNES 354, Intro Medical Nutrition Therapy . . . . .	4	--
HNES 340, Community Health Nutrition . . . . .	3	--
HNES 440, Nutrition Educ & Counseling Skills. . . . .	3	--
<b>Curriculum Total.</b> . . . . .	<b>20</b>	

**Human Performance and Fitness Major**

The Human Performance and Fitness (HPF) major is endorsed by the American College of Sports Medicine: This curriculum covers the knowledge, skills, and abilities expected of an ACSM Health/Fitness Instructor(r).

The major is designed to prepare students for entry-level positions in any of four health fitness settings: commercial, community, corporate, and clinical. Completion of the major will also act as a stepping stone to prepare the exceptional student for graduate education in exercise physiology/science, cardiac rehabilitation, physical therapy, sports nutrition, sports medicine, biomechanics, and other allied health professions.

The HPF program includes everything from the study of physical activity and the associated acute and chronic physiological adaptations and responses to it, to health-fitness business management principles found in facilities worldwide. Majors are encouraged to select a minor in Business Administration, Nutrition, Psychology, Gerontology, or any other area depending on their interests. Field experience courses during the four-year program as well as a capstone experience involving a semester-long internship required at the end of the HPF program affords the student an opportunity to select an area of specialization in the field from sites available throughout the country.

Students are encouraged to pursue appropriate professional certification from the American College of Sports Medicine, The National Strength and Conditioning Association, or The American Council on Exercise.

### Recommended '06-07 Curriculum Human Performance and Fitness

	Credits	
	F	S
<b>First Year</b>		
CSCI 114, Microcomputer Packages <b>or</b>		
CSCI 116, Business Use of Computers . . . . .	3-4	--
ENGL 110, College Composition I . . . . .	3	--
ENGL 120, College Composition II . . . . .	3	--
HD&E 189, Skills for Academic Success . . . . .	1	--
HNES 110, Intro to HPER . . . . .	1	--
HNES 170, Intro to Human Perform & Fitness . . . . .	2	--
Humanities Electives, . . . . .	3	3
MATH 104, Finite Mathematics . . . . .	3	--
Social & Behavioral Sciences Electives . . . . .	3	--
Elective, . . . . .	3	--
Totals . . . . .	13	15-16

<b>Second Year</b>		
BIOL 220/220L, Human Anatomy & Physiology I/Lab . . . . .	4	--
BIOL 221/221L, Human Anatomy & Physiology II/Lab . . . . .	4	--
CHEM 117, Chemical Concepts & Appli . . . . .	3	--
COMM 110, Fund of Public Speaking . . . . .	3	--
HNES 271, Tech of Strength Conditioning . . . . .	3	--
HNES 272, Tech of Cardio Conditioning . . . . .	3	--
HPER 210, First Aid & CPR . . . . .	2	--
Social & Behavioral Sciences Elective . . . . .	3	--
Electives, . . . . .	3	3
Totals . . . . .	15	16

<b>Third Year</b>		
HNES 250, Nutrition Science . . . . .	3	--
HNES 251, Nutrition, Growth, & Dev . . . . .	3	--
HNES 365, Kinesiology . . . . .	3	--
HNES 368, Biomechanics of Sport . . . . .	3	--
HNES 370, Activity Benefits/Exercise Prescription . . . . .	3	--
HNES 371, Fitness Programming/Management . . . . .	2	--
HNES 455, Sports Nutrition . . . . .	3	--
HNES 465, Physiology of Exercise . . . . .	3	--
HNES 466, Physiology of Exercise Lab . . . . .	1	--
HNES 491, Seminar/HPF . . . . .	1	--
HNES 496, Field Experience . . . . .	1	--
Electives . . . . .	9	--
Totals . . . . .	17	18

<b>Fourth Year</b>		
HNES 467, EKG Monitoring Physiology . . . . .	2	--
HNES 472, Aerobic Fitness Assessment & Tech . . . . .	3	--
HNES 473, Anaerobic ExPres & Ad RT Tech . . . . .	3	--
HNES 475, Human Performance & Fitness Internship (Capstone) . . . . .	12	--
HNES 491, Seminar/HFI Exam . . . . .	1	--
HNES 496, Field Experience . . . . .	1	--
Electives . . . . .	6	--
Totals . . . . .	16	12

**Curriculum Total . . . . . 122**

### Physical Education Major

The degree programs in Physical Education are four-year curricula designed to prepare students for teaching or leadership roles in schools, sports, business, community fitness programs, and related fields.

A well-prepared physical educator is knowledgeable and skilled in the natural and behavioral sciences, humanities, symbolic systems, and learning theories. The major field stresses contemporary knowledge, history, philosophy, and principles related to physical education. Course work in multicultural education and education of the developmentally disabled is included. Students are urged to choose a second major or several minors to qualify for emerging occupational opportunities.

### Physical Education

Students who wish to become certified grade K-12 Physical Education teachers enroll for 37 general education credits and a minimum of 33 professional education credits that include student teaching (see School

of Education requirements). The teacher education program is a selective enrollment program that leads to a B.S. degree. Students must apply to the School of Education for admission.

### Recommended '06-07 Curriculum Physical Education: Teaching

	Credits	
	F	S
<b>First Year</b>		
COMM 110, Public Speaking . . . . .	3	--
CSCI 114, Micro Comp Packages <b>or</b>		
CSCU 116, Busn use of Computers . . . . .	3-4	--
ENGL 110, College Composition I . . . . .	3	--
ENGL 120, College Composition II . . . . .	3	--
HD&E 189, Skills for Academic Success . . . . .	1	--
HNES 110, Intro to HPER . . . . .	1	--
HNES 150, Found of Phys Ed . . . . .	2	--
HNES 154, Prof Activities in Elem School . . . . .	3	--
HPER 217, Personal/Community Health . . . . .	3	--
PSYC 111, Intro to Psychology . . . . .	3	--
Quantitative Reasoning, . . . . .	3	--
Electives, . . . . .	3	--
Totals . . . . .	16	15-16

<b>Second Year</b>		
BIOL 220, Human Anatomy I . . . . .	3	--
BIOL 220L, Human Anatomy I/Lab . . . . .	1	--
HPER 210, First Aid & CPR . . . . .	2	--
HNES 253, Motor Learning & Performance . . . . .	3	--
HNES 255, Prof. Prep in Middle School Activ. . . . .	3	--
HNES 256, Prof. Prep in H.S. Activities . . . . .	3	--
CDFS 230, Life Span Develop <b>or</b>		
PSYC 250, Developmental Psych. . . . .	3	--
SOC 110, Intro to Sociology . . . . .	3	--
Electives . . . . .	3	7
Totals . . . . .	16	15

<b>Third Year</b>		
<b>(Admission to SOE)</b>		
EDUC 321, Intro to Teaching . . . . .	3	--
EDUC 322, Educational Psychology . . . . .	3	--
EDUC 381, Early Experience . . . . .	1	--
EDUC 489, Nat Amer/Multicultural Instr. Prac. . . . .	3	--
HNES 300, Curr, Stand & Assess in Phys Ed. . . . .	3	--
HNES 350, Fitness Edu/Act/Mat. . . . .	3	--
HNES 352, Phy Ed Activities & Materials . . . . .	3	--
HNES 367, Prin of Conditioning . . . . .	3	--
Humanities/Electives/Minor . . . . .	3	6
Totals . . . . .	16	15

<b>Fourth Year</b>		
EDUC 451, Inst Plan, Methods, & Assessment . . . . .	3	--
EDUC 481, Classroom Practice, Meth of Teaching PE K-12 . . . . .	3	--
EDUC 485, Student Teaching Sem . . . . .	1	--
EDUC 486, Classroom Mgt of Diverse Learn . . . . .	2	--
EDUC 487, Student Teaching/Elementary/Sec . . . . .	9	--
EDUC 488, Applied Student Teaching . . . . .	3	--
EDUC 494, Field Experience . . . . .	1	--
HNES 461, Admin & Social Aspects of Phys Activ & Athletics (Capstone) . . . . .	3	--
HD&E 320, Professional Issues . . . . .	1	--
Electives, . . . . .	4	--
Totals . . . . .	17	13

**Curriculum Total . . . . . 123**

### Recommended '06-07 Curriculum Physical Education Minor

	Credits	
	F	S
HPER 210, First Aid & CPR . . . . .	2	--
HNES 253, Motor Learning & Performance <b>or</b>		
HNES 365, Kinesiology & Biomechanics . . . . .	3	--
HNES 352, Phys Educ Activities & Materials . . . . .	3	--
HNES 367, Prin of Conditioning <b>or</b>		
HNES 465 Physiology of Exercise . . . . .	3	--
EDUC 481, Classroom Pract/Meth of Teaching K-12 . . . . .	3	--

HNES 255, Prof Preparation in Middle School Act. . . . .	3	--
HNES 256, Prof Preparation in High School Act. . . . .	3	--
HPER 154, Prof Prep in Elem School Activ. . . . .	3	--

**Curriculum Total . . . . . 17**

### Health Education Major

The Health Education major is designed to prepare students for careers in the field of community health education and/or school health education through the development of dispositions, knowledge, and skills. A Health Education minor is also available.

The Community Health Education option is a non-teaching major offered for students interested in pursuing community health, health promotion/work-site careers in the public sector.

The School Health Education option is a professional teaching preparation program designed to meet the needs of those interested in a K-12 teaching career.

The Teacher Education program is a selective enrollment program that leads to a B.S. degree. Students must apply to the School of Education for admission.

### Recommended '06-07 Curriculum Health Education Community Health Option

	Credits	
	F	S
<b>First Year</b>		
COMM 110, Fund of Public Speaking . . . . .	3	--
HNES 110, Intro to HNES . . . . .	1	--
HNES 160, Found of Health Prof . . . . .	2	--
ENGL 110, College Composition I . . . . .	3	--
PSYC 111, Intro to Psychology . . . . .	3	--
HD&E 189, Skills for Academic Success . . . . .	1	--
Quantitative Reasoning, (103) . . . . .	3	--
HPER 217, Personal & Community Health . . . . .	3	--
ENGL 120, College Composition II . . . . .	3	--
CSCI 114, Microcomputer Packages <b>or</b>		
CSCI 116, Business Use of Comp . . . . .	3-4	--
CDFS 135, Family Science . . . . .	3	--
SOC 110, Intro to Sociology . . . . .	3	--
Total . . . . .	16	15-16

<b>Second Year</b>		
BIOL 220, Human Anatomy I . . . . .	3	--
BIOL 220L, Human Anatomy I/Lab . . . . .	1	--
BIOL 221, Human Anatomy II . . . . .	3	--
BIOL 221L, Human Anatomy II Lab . . . . .	1	--
Elective . . . . .	3	6
HNES 212, Psychol Aspects of Drug Use & Abuse . . . . .	3	--
HPER 210, First Aid & CPR . . . . .	2	--
HNES 251, Nutrition, Growth, & Development. . . . .	3	--
NUTR 240, Prin of Nutrition <b>or</b>		
HNES 250, Nutrition Science . . . . .	3	--
A course in Community Health/Nutrition . . . . .	3	--
Total . . . . .	15	16

<b>Third Year</b>		
SOC 202, Minorities & Race Relations . . . . .	3	--
CDFS 230, Life Span Development <b>or</b>		
PSYC 250 . . . . .	3	--
Elective . . . . .	4	--
Humanities & Fine Arts . . . . .	6	--
HNES 341, Psycho/Social Aspects of Health . . . . .	3	--
HNES 345, Materials & Concepts of Health Ed . . . . .	3	--
HNES 452, Nutrition, Health & Aging . . . . .	3	--
Elective . . . . .	3	--
Science & Technology . . . . .	3	--
HD&E 320, Professional Issues . . . . .	1	--
Total . . . . .	16	16

<b>Fourth Year</b>		
COMM 480, Health Communications . . . . .	3	--
Elective . . . . .	7	--
HNES 445, Organ. & Admin. of Coord. Health Program . . . . .	3	--
HNES 482, Community Health Internship . . . . .	12	--
STAT 330, Introductory Stats . . . . .	3	--
Total . . . . .	16	12

**Curriculum Total . . . . . 122**

## Recommended '06-07 Curriculum Health Education Teaching/School Health Option

	Credits	
	F	S
<b>First Year</b>		
Elective.....	3	--
HNES 110, Intro to HNES.....	1	--
HNES 160, Found of Health Profess.....	2	--
ENGL 110, College Composition I.....	3	--
PSYC 111, Intro to Psychology.....	3	--
Quantitative Reasoning.....	3	--
HD&E 189, Skills for Academic Success.....	1	--
HPER 217, Personal & Community Health.....	--	3
ENGL 120, College Composition II.....	--	3
CSCI 114, Microcomputer Packages <b>or</b>		
CSCI 116, Busn Use of Computers.....	--	3-4
COMM 110, Fund of Public Speaking.....	--	3
CDFS 135, Family Science.....	--	3
<b>Total.....</b>	<b>16</b>	<b>15-16</b>

<b>Second Year</b>		
BIOL 220/220L, Human Anat & Phys I/Lab.....	3/1	--
Elective.....	3	--
SOC 110, Intro to Sociology.....	3	--
PSYC 212, Psych Aspects of Drug Use & Abuse.....	3	--
NUTR 240, Prin of Nutrition <b>or</b>		
HNES 250 Nutrition Science.....	3	--
BIOL 221/221L, Human Anat & Phys II/Lab.....	--	3/1
CDFS 230, Life Span Develop. <b>or</b>		
PSYC 250, Developmental Psychology.....	--	3
Elective.....	--	3
HPER 210, First Aid & CPR.....	--	2
HNES/PSYC 210, Human Sexuality.....	--	3
<b>Total.....</b>	<b>16</b>	<b>15</b>

<b>Third Year</b>		
<b>(Admission to School of Education)</b>		
Humanities & Fine Arts.....	3	--
Elective.....	3	--
EDUC 321, Intro to Teaching.....	3	--
EDUC 322, Educational Psychology.....	3	--
EDUC 381, Early Experience.....	1	--
Science/Tech,.....	3	--
EDUC 489, Nat American/Multicult Inst. Prac.....	--	3
HNES 345, Materials & Concepts of Health Educ.....	--	3
HNES 341, Psycho/Social Aspects of Health.....	--	3
Elective.....	--	4
Humanities & Fine Arts.....	--	3
<b>Total.....</b>	<b>16</b>	<b>16</b>

<b>Fourth Year</b>		
EDUC 451, Instruc, Planning, Meth & Assess.....	3	--
EDUC 481, Classroom Prac/Meth of		
Teach Health Ed K-12.....	3	--
EDUC 486, Classroom Mgt of Diverse Learners.....	2	--
Elective.....	3	--
HD&E 320, Professional Issues.....	1	--
HNES 445, Organ. & Admin. of Coor.		
School Health Program.....	3	--
EDUC 485, Student Teach Seminar.....	--	1
EDUC 487, Student Teach Capstone.....	--	9
EDUC 488, Applied Student Training.....	--	3
EDUC 494, Field Experience.....	1	--
<b>Total.....</b>	<b>16</b>	<b>13</b>
<b>Curriculum Total.....</b>	<b>123</b>	

## Health Education Minor

This minor has an emphasis on comprehensive health education. It prepares the graduate for employment as a health educator in the school and/or community health setting. Students who have earned this minor as a complement to their major have been from the following curricula: Counseling, Nursing, Child Development and Family Science, Food and Nutrition, Athletic Training, Human Performance and Fitness, English, Mathematics, Psychology, and Physical Education. A minimum of 17 credits is required with the following curriculum:

	Credits	
	F	S
HPER 210, First Aid & CPR.....		2
HNES 217, Personal & Community Health.....	3	--
HNES 345, Materials & Concepts of Health Educ.....	3	--
HNES 445, Organ. & Admin. of Coordinated		
School Health Programs.....	3	--
NUTR 240, Prin of Nutrition <b>or</b>		
HNES 250, Nutrition Science.....	3	--
PSYC 212, Psychology Aspects/Drugs Use/Abuse <b>or</b>		
PSYC 210, Human Sexuality.....	3	--

## Sports and Recreation Studies Major

The Sport and Recreation Studies major (SRS) is designed to prepare students for careers in Sport Management organizations and Recreation Management organizations. SRS has two study options including:

The Sport Management (SM) option is structured to prepare students for employment in local, state, regional, national or international level sport organizations.

The SM option's major area of coursework includes 72 credit hours, 12 of which are taken in the final semester of the senior year as an internship at an approved local, state, regional, national or inter-national level sport organization.

To enhance employment prospects, undergraduate candidates in the SM option are encouraged to consider completion of a supporting minor such as Business or Communications.

A total of 122 credits are required to earn a degree in the Sport and Recreation Studies major, Sports Management option.

The Recreation Management (RM) option is designed to prepare students for professional and administration and leadership positions in parks and recreation. Students learn and develop skills for employment in federal, state, municipal, hospital, and private recreation settings.

The major area of coursework in the RM option is 32 credit hours, 12 of which are taken as an internship at an approved recreation agency.

To enhance employment prospects, undergraduate candidates in the SM option are encouraged to consider completion of a supporting minor in Business or Communications.

A total of 122 credits are required to earn a degree in the Sport and Recreation Studies major, Recreation Management option.

## Comments

Prerequisite classes (identified with a \*) must be completed (with a 3.0 GPA) before a student can declare Sport and Recreation Studies, Sport Management option, or Recreation Management option as their major. The major option is declared at the end of the freshman year. Program fees are charged after a major is declared. Transfer students wishing to declare the major can do so upon Program approval. Student MUST declare the major before being able to enroll in HNES major requirement courses. Students must have a cumulative grade point average of 2.5 or higher to enroll in BUSN 350, 430, 435.

## Recommended '06-07 Curriculum Sport Management Option

	Credits	
	F	S
<b>First Year</b>		
HNES 110*, Intro to HNES.....	1	--
SOC 110, Intro to Sociology.....	3	--
THEA 161.....	3	--
ENGL 110, College Comp I.....	3	--
HD&E 189, Skill for Academic Success.....	1	--
HPER 100, Concepts of Fitness.....	2	--
HNES 190*, Intro to Sport &		
Recreation Studies.....	2	--

	Credits	
	F	S
HPER 210, First Aid & CPR.....	--	2
ENGL 120, College Comp II.....	--	3
CSCI 116, Business Computers.....	--	4
COMM 110, Fund of Public Speaking.....	--	3
COMM 112, Understanding Media.....	--	3
HNES 211*, Successful Coaching.....	--	1
<b>Total.....</b>	<b>15</b>	<b>16</b>

<b>Second Year</b>		
ACCT 200, Elem of Accounting I.....	3	--
PHIL 210 or 216, Ethics.....	3	--
COMM 200, Intro to Media Writing.....	3	--
COMM 260, Prin of Internet Web Based Design.....	3	--
HNES 224, Event Management in Sport.....	3	--
ACCT 201, Elem of Accounting II.....	--	3
COMM 261, Intro to Web Development.....	--	3
COMM 310, Advance Media Writing.....	--	3
PSYC 111, Intro to Psychology.....	--	3
GEOG 151, Human Geography.....	--	3
<b>Total.....</b>	<b>15</b>	<b>15</b>

<b>Third Year</b>		
BUSN 431, Business Law I.....	3	--
HNES 431, Governance in Sport.....	3	--
Humanities.....	3	--
GEOG 105, Physical Geology/Lab.....	4	--
Sci/Tech Electives.....	3	--
BUSN 432, Business Law II.....	--	3
BUSN 350, Found of Management.....	--	3
HNES 430, Socio-Cultural Dimensions in Sport.....	--	3
Elective.....	--	3
Quantitative Reasoning.....	--	3
<b>Total.....</b>	<b>16</b>	<b>15</b>

<b>Fourth Year</b>		
HNES 426, Sport & Rec Admin.....	3	--
BUSN 467, Sports Marketing.....	3	--
COMM 462, Web Database Prog.....	3	--
Elective.....	6	--
HNES 436, Issues in Sport Mgmt Economics.....	--	3
HNES 428, Sport Mgmt Intern.....	--	12
<b>Total.....</b>	<b>15</b>	<b>15</b>

**Curriculum Total..... 122**

## Recommended Curriculum Recreation Management Option

	Credits	
	F	S
<b>First Year</b>		
HNES 110*, Intro to HNES.....	1	--
SOC 110, Intro to Sociology.....	3	--
THEA 161.....	3	--
ENGL 110, College Comp I.....	3	--
HD&E 189, Skills for Academic Success.....	1	--
HPER 100, Concepts of Fitness.....	2	--
HNES 190*, Intro to Sport &		
Recreation Studies.....	2	--
HPER 210, First Aid & CPR.....	--	2
ENGL 120, College Comp II.....	--	3
CSCI 116, Business Use of Computers.....	--	4
COMM 110, Fund of Public Speaking.....	--	3
COMM 112, Understanding Media & Soc Chge.....	--	3
HNES 211*, Successful Coaching.....	--	1
<b>Total.....</b>	<b>15</b>	<b>16</b>

<b>Second Year</b>		
ACCT 200, Elem of Accounting I.....	3	--
PHIL 210 or 216, Ethics.....	3	--
COMM 200, Intro to Media Writing.....	3	--
COMM 260, Prin of Internet Web Based Design.....	3	--
HNES 225, Camp Mgmt & Outdoor Recreation.....	3	--
ACCT 201, Elem of Accounting II.....	--	3
COMM 261, Intro to Web Development.....	--	3
COMM 310, Advanced Media Writing.....	--	3
PSYC 111, Intro to Psychology.....	--	3
GEOG 151, Human Geography.....	--	3
<b>Total.....</b>	<b>15</b>	<b>15</b>

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Third Year</b>		
BUSN 431, Business Law I . . . . .	3	--
HNES 431, Governance in Sport . . . . .	3	--
Humanities . . . . .	3	--
GEOL 105, Physical Geology Lab . . . . .	4	--
SCI/TECH Elective . . . . .	3	--
BUSN 432, Business Law II . . . . .	--	3
BUSN 350, Foundations of Management . . . . .	--	3
HNES 326, Recreation Program . . . . .	--	3
HNES 427, Leisure & Society . . . . .	--	3
HNES 491, Seminar . . . . .	--	1
HPER 217, Personal & Community Health . . . . .	--	3
Total . . . . .	16	16

<b>Fourth Year</b>		
HNES 426, Sport & Rec Admin . . . . .	3	--
COMM 462, Web Database Programming . . . . .	3	--
Quantitative Reasoning . . . . .	3	--
Electives, . . . . .	8	--
HNES 429, Recreation Mgmt Internship . . . . .	--	12
Total . . . . .	17	12

**Curriculum Total . . . . . 122**

## School of Education

[www.ndsu.edu/ndsu/education](http://www.ndsu.edu/ndsu/education)

Students contemplating careers in education may be encouraged to learn there is a shortage of teachers in certain academic and geographical areas. This trend, together with the knowledge that preparation in teaching may also lead to successful careers in business, industry, and the public sector, may make education an excellent choice for versatile careers.

Programs in education at NDSU are administered by the School of Education. The School of Education programs are accredited at the undergraduate and graduate levels by the National Council for Accreditation of Teacher Education (NCATE) and are approved by the North Dakota Education Standards and Practices Board. NCATE accreditation assures that graduates of the program may be certified/licensed as teachers in other states, and also indicates that the programs offered through the School of Education are of high quality.

Through the School of Education, students are prepared to be teachers, counselors, and school administrators capable of working effectively with diverse populations. Through course work and field experiences, students come to an appreciation of and commitment to cultural diversity and to the elimination of inequitable instructional and institutional practices.

**Note:** Consult the School of Education regarding transfer credits.

## Admission to the School of Education

Application forms and instructions for admission to the School of Education are available at the Teacher Education Office, 155 E. Morrow Lebedeff Hall. Students should check the School of Education Web site or contact the School of Education office for updates in procedures and requirements.

Students should apply for admission to the School of Education immediately following the introductory professional education course (EDUC 321). Late application may delay completion of program and graduation requirements. All applications to the school will remain valid for five years from the date of approval or until completion of the baccalaureate degree, whichever comes first.

The Council for Teacher Education reviews and acts upon completed applications. The Council is the body within the School of Education with jurisdiction over such matters as admission, retention, student teaching,

and certification/licensure. The Council informs the students of its action. For questions about admission policies, contact the Teacher Education Office.

### Admission of Undergraduate Students

Undergraduate students may gain admission to the School of Education by meeting the following requirements:

1. Provide evidence of maintaining a minimum grade-point average of 2.75 in the student's total academic program. Transfer students shall complete a minimum of one semester's work and obtain a 2.75 institutional grade-point average at NDSU before their applications are processed.
2. Complete the following:
  - Provide evidence of achieving passing scores on the Praxis I test of basic skills. (The student is responsible for registering for the test and paying the appropriate fee.)
3. Provide evidence of competence in English through any one of the following:
  - minimum ACT English test standard score of 20.
  - minimum grade-point average of 2.50 in English 110 and 120 or equivalent.
  - minimum of a B grade in English 358 or equivalent writing course.
4. Achieve a grade of B or better in COMM 110 or equivalent.
5. Interview with Teacher Education faculty. Check with the Teacher Education office for sign up information.
6. Provide a letter of recommendation.
7. Provide portfolio reflections (started in EDUC 321).
8. Complete 40 hours working with youth.

Students should submit a completed application for admission as soon as all of the preceding requirements have been satisfied. Up-to-date transcripts of all college-level work must accompany the application.

### Admission of Post-Baccalaureate Students

Students with college degrees seeking teacher certification/licensure should contact the School of Education certification officer for more information.

NDSU students who continue in school after graduation or who resume their education within one year following graduation will be considered on the same basis as undergraduates.

Students whose undergraduate academic average was below 2.75 shall increase their overall undergraduate grade-point average to 2.75 or achieve and maintain an average of 3.00 on post-baccalaureate course work while meeting the following conditions:

1. Obtain 24 approved credits in two contiguous semesters, or equivalent.
2. Take each course for a grade other than pass/fail.
3. Obtain approval of all courses from the Teacher Education program.

Post-baccalaureate students must submit an application showing evidence of meeting the requirements listed under "Admission of Undergraduate Students."

**Note:** These policies refer to admission to Teacher Education for purposes of certification/licensure and are not recommendations for admission to Graduate School.

### Student Teaching Policies

Prior to student teaching, all student teachers must meet all School of Education requirements including completion and submission of the verification of requirements form (available from the Teacher Education

Office). Because student teaching is a full-time experience, students shall not participate in extracurricular activities on campus or participate in employment that detracts from student teaching and shall not be registered for course work other than student teaching (EDUC 487, 488) and EDUC 485. A student teaching course fee is assessed.

### Program Exit Requirements

1. Students must complete a portfolio developed throughout the professional education courses based on the Interstate New Teachers Assessment and Support Consortium (INTASC) standards.
2. Students must earn a minimum GPA of 2.75 in each of the following programs:
  - total academic programs
  - teaching specialties
  - professional education courses consisting of a minimum of 27 credits
3. Students may complete an application for state certification/licensure and pay the appropriate fee to the state upon completion of the program. Application forms for some states are available from the certification officer.

### Special Notice

Changes in national and state legislation, standards, or rules may result in revised course work requirements. Students should contact the School of Education to keep abreast of possible developments in curriculum areas.

### NDSU Student Education Association

Students in Teacher Education are encouraged to join the NDSU Student North Dakota Education Association, which is affiliated with the Student North Dakota Education Association and the National Education Association Student Program. Members of this organization receive a number of benefits including workshops, publications, and liability insurance, and have the opportunities to be involved with many of the committees that govern the Teacher Education program at NDSU.

Persons interested in membership details should contact the School of Education or the SNDEA Student Program advisor.

Students are also encouraged to join the professional organization(s) relevant to their teaching specialties.

### Graduation Requirements

Graduation requirements for all students desiring teacher certification/licensure, secondary or K-12, include three basic parts: general education requirements, professional education requirements, and teaching specialty requirements.

#### 1. General Education

<i>(minimum 36-37 credits)</i>	<i>Credits</i>
HD&E 189, Skills for Academic Success . . . . .	1
Communication . . . . .	9
Quantitative Reasoning . . . . .	3
Science & Technology . . . . .	10
Humanities & Fine Arts . . . . .	6
Social & Behavioral Sciences . . . . .	6
Wellness . . . . .	2

#### 2. Professional Education

The required common professional education sequence includes the following:

	<i>Credits</i>
EDUC 321, Intro to Teaching . . . . .	3
EDUC 322, Educational Psychology . . . . .	3
EDUC 381, Early Experience . . . . .	1
EDUC 489, Nat Am/Multicultural Instr Prac . . . . .	3
EDUC 451, Instr Planning, Meth, & Assessment . . . . .	3
EDUC 481, Classroom Prac/Methods of Teaching . . . . .	2-3



	<b>Credits</b>
EDUC 485, Student Teaching Seminar . . . . .	1
EDUC 486, Classroom Mgt of Diverse Learners . . . . .	2
EDUC 487, Student Teaching . . . . .	9
EDUC 488, Applied Student Teaching . . . . .	3
EDUC 494, FE/Diverse Immersive . . . . .	1

Additional credits are required for programs in Agricultural Education, English Education, Family and Consumer Sciences Education, Music Education, and Physical Education.

### 3. Teaching Specialty

See the School of Education for requirements for the following:

Agricultural Education	Health Education
Biological Sciences	History
Chemistry	Mathematics
Comprehensive Science	Music
Earth Science	Physical Education
English	Physics
Family & Consumer Sciences Education	Social Sciences
French	Spanish

### Human and Community Education

State approved programs for the preparation of vocational education teachers are grouped under Human and Community Education (H&CE). Curricula in two areas are offered: Agricultural Education and Family and Consumer Sciences Education.

#### Agricultural Education

NDSU is designated by the State Board for Career and Technical Education as the recognized institution for preparing teachers of Agricultural Education. Programs are offered to prepare students for teaching Agricultural Education on the secondary, post-secondary, and adult levels. Graduates also secure employment in other agricultural occupations such as Cooperative Extension, government services, and agribusiness.

Upon completion of the program, students are eligible for certification to teach Agricultural Education in North Dakota and may be qualified for certification/licensure in a number of other states.

#### Family and Consumer Sciences Education

The Family and Consumer Sciences Education program at NDSU has been approved by the State Board for Career and Technical Education for the preparation of family and consumer sciences teachers. Thus, graduates are qualified to teach family and consumer sciences classes in vocational or non-vocational school programs at junior and senior high school levels.

In addition to fulfilling teacher certification/licensure requirements for North Dakota, graduates may be qualified for certification/licensure in a number of other states.

Graduates are also qualified to teach in adult education programs and to serve as extension home economists. Alternate career opportunities include positions with utility companies, health and human service agencies, and retail establishments.

#### K-12 Certification/Licensure for Physical Education and Music Majors

Certification/licensure for kindergarten through 12th grade programs (K-12) is available for students majoring in Physical Education or Music Education. The student must enroll in CDFS 230 or PSYC 250, Elementary Teaching Methods, and student teach at both the elementary and secondary levels, as well as meet the specific requirements for each major department.

### Elementary Education/CDFS Dual Degree Program

Students may concurrently earn a degree in Elementary Education from Valley City State University and a degree in Child Development and Family Science from NDSU while located on the NDSU campus. It allows the student to earn two degrees from two universities in the timeframe it typically takes to earn one baccalaureate degree. See department for details.

### Recommended Curriculum Extension Education Minor

The Extension Education minor provides educational background and presentation skills for individuals who seek careers associated with the Cooperative Extension Service. This minor is offered through the Agricultural Education and the Family and Consumer Sciences Education programs.

	<b>Credits</b>
H&CE 341, Leadership & Presentation Tech. . . . .	3
H&CE 345, Extension Education . . . . .	2
H&CE 444, Planning the Community Program in Ag Educ <b>or</b>	
H&CE 468, Family Life & Adult Educ Pgms . . . . .	3
H&CE 445, Technology Transfer in Agriculture . . . . .	3
H&CE 481, Methods of Teaching Agriculture <b>or</b>	
H&CE 482, Methods of Teaching Family & Consumer Sciences <b>or</b>	
EDUC 451, Instruc Planning Methods & Assessments . . . . .	3
H&CE 496, Extension Internship . . . . .	6-9
<b>Curriculum Total. . . . .</b>	<b>20-23</b>

### Title II Institutional Report

To comply with the requirements of Section 207 of Title II of the Higher Education Act, NDSU has provided the following information to the North Dakota Education Standards and Practices Board.

#### Section I. Pass rates

**PPST Reading:** NDSU Range 186-173, Median 182, N=60, National Range 187-151, Median 179.

**PPST Writing:** NDSU Range 187-171, Median 177, N=60, National Range 188-153, Median 176.

**PPST Mathematics:** NDSU Range 190-172, Median 184, N=60, National Range 190-150, Median 178.

#### Section II. Program information

- Number of students in the regular teacher preparation program:
  - Total number of students enrolled during 2002-2003: **Full-time = 318; Part-time = 98**
- Information about supervised student teaching:
  - Number of students in programs of supervised student teaching during academic year 2002-2003: **78**
  - Number of supervising faculty who were: Appointed full time in professional education: **7**  
Appointed part time in professional education and full time in the institution: **4**  
  
Appointed part time in professional education, not otherwise employed by the institution: **0**  
Total number of supervising faculty for the teacher preparation program during 2002-2003: **11**
  - The student/faculty ratio was (divide the total given in B2. by the number given in B3.): **8/1**

- The average number of hours per week required of student participation in supervised student teaching in these programs was: **40 hours**. The total number of weeks of supervised student teaching required is **16**. The total number of hours required is **640 hours**.

- Information about state approval or accreditation of teacher preparation programs:

- Is your teacher preparation program currently approved or accredited by the state? **Yes**
- Is your teacher preparation program currently under a designation as "low-performing" by the state (as per section 208(a) of the HEA of 1998)? **No**

### Section III. Contextual information

\* The School of Education at NDSU is accredited by the National Council for Accreditation of Teacher Education (NCATE), 2010 Massachusetts Ave NW, Suite 5000, Washington, DC 20036; phone (202)466-7496. This accreditation covers the institution's initial and advanced teacher education, advanced educational leadership, and advanced school counseling programs.

The School Counseling program is accredited by the Council for the Accreditation of Counseling and Related Educational Programs (CACREP), 5999 Stevenson Avenue, Alexandria, VA 22304; phone (703)823-9800.

The initial and advanced Teacher Education, advanced Educational Leadership, and advanced School Counseling programs at NDSU are approved/accredited by the North Dakota Education Standards and Practices Board (ESPB), 2718 Gateway Ave., Suite 303, Bismarck, ND 58503-0585; phone (701) 328-9641.

The Teacher Education, Educational Leadership, and School Counseling programs at NDSU utilize the "Reasoned Action Model" as the organizing conceptual framework. A copy can be reviewed in room 210, Family Life Center, NDSU campus, phone 231-7921.

All initial Teacher Education candidates are required to prepare and submit portfolios as part of the assessment process.

For more information, contact Chair, NDSU School of Education, PO Box 5057, Fargo, ND 58105-5057. Telephone 231-7921.

# COLLEGE OF PHARMACY, NURSING, AND ALLIED SCIENCES

[www.ndsu.edu/pharmacy](http://www.ndsu.edu/pharmacy)

Sudro Hall 123 (701) 231-7456

Charles D. Peterson, Dean

The College of Pharmacy at North Dakota State University has provided an education for men and women in pharmacy and the pharmaceutical sciences since 1902. The most recent change was in the fall of 1990 when a six-year entry-level Doctor of Pharmacy (Pharm.D.) program was implemented.

The college introduced an associate degree nursing program in 1969, which was discontinued in 1987. In 1986, the college initiated a four-year baccalaureate degree program in nursing.

Baccalaureate degree programs in the allied health fields of clinical laboratory science, respiratory care, and radiologic science joined the college in 2006.

## Degree Programs

The College of Pharmacy offers academic programs in pharmacy, nursing, clinical laboratory science, respiratory care and radiologic science. Admission requirements, curricula and degree titles differ for the programs.

The Pharmacy curriculum consists of a six-year professional program leading to the Pharm.D. degree. Graduates are qualified to apply for licensure as pharmacists. In addition, a two-year post-baccalaureate Pharm.D. program is available through the college. Graduate programs leading to an M.S. and a Ph.D. in Pharmaceutical Sciences also are available.

The baccalaureate nursing program is a four year course of study leading to a Bachelor of Science in Nursing (BSN) degree. Graduates are eligible to apply for admission to take the national licensing examination (NCLEX) to become a registered nurse (RN). Graduate programs leading to a Master of Science in Nursing (MS) and a Doctor of Nursing Practice (DNP) also are available.

Four year degree plans in Clinical Laboratory Science (CLS), Respiratory Care (RC) and Radiologic Sciences (RS) include academic course work on campus and an internship in an affiliated, accredited hospital-based clinical program. Twelve month internships are required of CLS and RC majors and a 24-month internship is required for RS majors. Graduates are eligible to write national certifying examinations.

## Academic Preparation and Professional Requirements

Certain preparation in addition to the minimum core curriculum requirements is advisable if a student is to enter easily and progress smoothly through a particular university curriculum. Additional high school preparation for the pharmacy major is recommended. Prospective pharmacy majors should present strong preparation in mathematics, in the physical/biological sciences, and in communication skills.

All students must complete all required courses with a grade of C or above. Further, transfer credits with grades of D are not accepted for program requirements. All students must maintain a semester GPA of 2.0 or above for each semester in the College of Pharmacy. A student who fails to meet this standard for two successive or three non-successive semesters shall be terminated from enrollment in the College of Pharmacy, Nursing and Allied Sciences.



The faculty of the college reserves the right to terminate the registration of any student at any time if, in the opinion of the faculty, the student demonstrates that he or she is unsuited for a professional health career and its inherent responsibilities and obligations. Circumstances that may lead to student termination will include, but not be limited to, violation of state or federal statutes or regulations concerning drugs or controlled substances.

## Admission

Selection committees will evaluate applicants for admission to the college professional programs. Evaluations will be based on college records, state residency, Pharmacy College Admission Test (PCAT) scores, and other pertinent information. A personal visit, which includes an interview and test, may be part of the evaluation process.

A minimum cumulative GPA of 3.00 in college course work is required for evaluation for admission, with completion of all required prerequisite courses by the end of spring term prior to beginning the professional program. Actual admission "cut off" is generally much higher.

NDSU course work and transfer credits with grades of D are not accepted for program requirements.

**Pharmacy.** Applications for admission to the professional program must be made by January 1 of the sophomore year in pre-pharmacy for fall semester admission. Applications for admission to the post-baccalaureate Pharm.D. program must also be made by January 1. All applicants will receive notice of their status by June 15.

**Nursing.** Applications for admission to the baccalaureate program should be made by June 1 for the class beginning in the spring semester of the

sophomore year. Applicants will receive notification of their status by July 15.

**Clinical Laboratory Science.** NDSU maintains affiliation agreements with various schools of clinical laboratory science that provide the necessary 12-month internship. Criteria for admission to the internship are established by each school and generally include academic performance, references, prior work experience, and an interview. Admission to the internship is selective. Applications for the internship are due to the academic director of CLS by September 30, however, application deadlines do vary among affiliated programs.

**Radiologic Sciences.** Students who have completed a minimum of the first two years of course work on campus and meet the GPA requirements established by affiliated programs are eligible to apply for the 24-month internship. Transfer students must complete a minimum of 20 resident credits at NDSU. Admission into the internship is competitive and based upon academic achievement, references, work experience, and an interview. Applications for the internship are due to the academic director of RS by December 1, however, application deadlines do vary among affiliated programs.

**Respiratory Care.** Students eligible for internship application will have completed the first two years of the RC curriculum by the start of an internship and have a minimum GPA of 2.50. Application deadline is March 1. Admission into the internship is selective and is based upon successful completion of all internship prerequisites (a minimum of 20 resident credits at NDSU for transfer students), GPA, references, interview, and career motivation.

## Department of Allied Sciences

[www.ndsu.edu/cls](http://www.ndsu.edu/cls)  
[www.ndsu.edu/rc](http://www.ndsu.edu/rc)  
[www.ndsu.edu/rs](http://www.ndsu.edu/rs)

### Clinical Laboratory Science Major

Clinical laboratory scientists use the latest biomedical instruments to perform laboratory tests to determine the presence of disease and aid in patient treatment, monitor quality, evaluate and communicate results, and research and develop new tests and methodologies.

To become a certified medical technologist or clinical laboratory scientist, a student must complete three years (92 semester credits) of university course work, a 12-month internship at an accredited school of clinical laboratory science, and pass a national certifying examination. The Clinical Laboratory Science curriculum leading to the Bachelor of Science degree includes university general education requirements and the entrance requirements for schools of clinical laboratory science (16 credits each of biological sciences and chemistry, including organic and biochemistry, microbiology, immunology, and a course in mathematics). Courses in management, research methods, and virology are also recommended.

NDSU has affiliation agreements with various schools of clinical laboratory science that provide the professional education or internship. Criteria for admission to the year of internship are established by each school and generally include academic performance, references, prior work experience, and an interview. Admission to the internship is selective. Internship application procedures, descriptions of professional courses, and registration information for the year of internship are available from the CLS academic director. Grades submitted by the clinical institution for each of the courses taken during the professional training are attached to the student's official university transcript, but are not included in calculation of grade-point average.

### Recommended '06-07 Curriculum Clinical Laboratory Science Major

	Credits	
	F	S
<b>First Year</b>		
BIOL 150, 150L, General Biology, Lab . . . . .	3,1	--
CHEM 121, 122, General Chemistry I, II. . . . .	3	3
CHEM 121L, 122L, General Chemistry Labs . . . . .	1	1
CLS 111, Intro to Clinic Lab Science. . . . .	1	--
COMM 110, Fund of Public Speaking . . . . .	--	3
CSCI 114, Microcomp Pkgs . . . . .	--	3
ENGL 110, 120, College Composition I, II. . . . .	3	3
MATH 103, College Algebra . . . . .	3	--
UNIV 189, Skills for Academic Success . . . . .	1	--
Wellness . . . . .	--	2
Totals . . . . .	15	16
<b>Second Year</b>		
BIOL 220, Human Anatomy/Phys I . . . . .	3	--
BIOL 220L, Human Anatomy/Phys I Lab. . . . .	1	--
BIOL 221, Human Anatomy & Phys II. . . . .	--	3
BIOL 221L, Human Anatomy/Phys II Lab . . . . .	--	1
CHEM 240 <sup>1</sup> , Survey/Organic Chemistry <b>or</b> . . . . .	3	--
CHEM 341, Organic Chemistry I . . . . .	3	--
CHEM 341L, Organic Chemistry I Lab . . . . .	1	--
CHEM 342, Organic Chemistry II . . . . .	3	--
MICR 350, General Microbiology . . . . .	3	--
MICR 350L, General Microbiology Lab . . . . .	1	--
MICR 460, Pathogenic Microbiology . . . . .	--	3
MICR 460L, Pathogenic Micro Lab. . . . .	--	2
ZOO 315, 315L, Genetics, Lab . . . . .	--	3,1
General Education . . . . .	6	--
Totals . . . . .	17-18	16

	Credits	
	F	S
<b>Third Year</b>		
BIOC 460, Fund of Biochemistry . . . . .	4	--
BIOL 435, Hematology . . . . .	--	2
MICR 363, Clinical Parasitology . . . . .	--	2
MICR 470, 471, Immunology, Lab . . . . .	3,2	--
STAT 330, Intro to Statistics . . . . .	--	3
General Education/Electives. . . . .	6	6
Totals . . . . .	15	13

#### Summer Session

CLS 496, Field Experience/Internship . . . . .	--	6
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#### Fourth Year

CLS 496, Field Experience. . . . .	12	12
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Credits earned at an accredited school of clinical laboratory science

**Curriculum Total. . . . . 122**

<sup>1</sup>Students choosing to fulfill the organic chemistry requirement with CHEM 240 must also complete BIOC 461, Foundations of Biochemistry and Molecular Biology II, 4 credits.

### Radiologic Sciences Major

Radiographers perform diagnostic imaging examinations to assist physicians to diagnose or rule out disease or injury.

The baccalaureate Radiologic Sciences (RS) program includes two or more years of academic course work on campus and a 24-month professional phase or internship that includes classroom and clinical education specific to radiology. Academic course work includes chemistry, physics, anatomy and physiology, microbiology, trigonometry, and computer science, in addition to general education requirements. Each student also completes a minimum of 15 credits of 300-400 level special elective courses on campus related to a specialty area of interest in radiologic sciences. A list of approved special elective courses is available from the RS advisor.

Students who have completed the first two years of course work on campus and meet the GPA requirements are eligible to apply for an internship. In addition, transfer students must complete a minimum of 20 resident credits at NDSU prior to the start of an internship to be eligible to apply to affiliated programs. Admission into the internship is competitive and based upon academic achievement, references, work experience, and an interview.

The internship provides 60 credits of classroom and clinical instruction in patient care procedures, radiation physics and protection, principles of imaging, positioning, radiobiology, and pathology. Affiliated radiology programs are accredited by the Joint Review Committee for Education in Radiologic Technology. Upon completion of the internship, graduates are eligible to write the national certifying examination to become a registered radiologic technologist, RT(R).

Descriptions of professional courses and registration procedures for the internship are available from the RS academic director. Grades submitted for each of the courses taken during the internship are attached to the student's official university transcript, but are not included in calculation of grade-point average.

### Recommended '06-07 Curriculum Radiologic Sciences Major<sup>1</sup>

	Credits	
	F	S
<b>First Year</b>		
ENGL 110, 120, College Composition I, II. . . . .	3	3
BIOL 220, 221, Human Anatomy/Phys I, II . . . . .	3	3
BIOL 220L, 221L, Human Anatomy/ Phys Labs . . . . .	1	1
MATH 105, Trigonometry. . . . .	3	--
RS 111, Intro to Radiologic Science. . . . .	1	--
UNIV 189, Skills for Academic Success . . . . .	1	--
CSCI 114, Microcomputer Pkgs . . . . .	--	3
MICR 202, 202L, Intro Micro, Lab. . . . .	--	2,1
PSYC 111, Intro to Psychology . . . . .	3	--
General Education . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	17	16

#### Second Year

COMM 110, Fund of Public Speaking . . . . .	3	--
CHEM 117, 117L, Chem Concept, Lab <sup>2</sup> . . . . .	3,1	--
CHEM 260, Elem of Biochemistry <sup>2</sup> . . . . .	--	4
PHYS 211, 212, College Physics I, II. . . . .	3	3
PHYS 211L, 212L, College Physics Labs . . . . .	1	1
General Education . . . . .	3	3
STAT 330, Intro to Statistics . . . . .	--	3
VETS 115, Med Term for the Para. . . . .	--	1
PHRM 300, Prin of Clinic Pharmacy. . . . .	3	--
Specialty Option Elective . . . . .	--	3
Totals . . . . .	17	18

#### Third Year

	F	S	Sr
Specialty Option elective . . . . .	3	3	--
RS 496, Internship <sup>3</sup> . . . . .	12	12	6
Totals . . . . .	15	15	6

#### Fourth Year

Specialty Option Elective . . . . .	3	3	--
RS 496, Internship <sup>3</sup> . . . . .	12	12	6
Totals . . . . .	15	15	6

**Curriculum Total. . . . . 140**

<sup>1</sup>This is a sample curriculum. Other variations are possible. Students should meet with their RS advisor to plan schedules.

<sup>2</sup>CHEM 117, 117L and CHEM 260 are the minimum requirement for RS majors. Students may complete either of the following sequences and substitute them for the minimum requirement: CHEM 121, 121L/122, 122L, CHEM 240, and CHEM 260 OR CHEM 121, 121L/122, 122L, CHEM 341, 341L, 342, and BIOC 460, 461.

<sup>3</sup>Credits earned in an accredited, affiliated radiology program.

### Respiratory Care Major

Respiratory Care (RC) is an allied health profession that involves the evaluation, treatment, and education of patients with cardiopulmonary disorders. Respiratory therapists (RTs) work closely with physicians, nurses, and other allied health members in critical care, emergency rooms, nursery and pediatrics, medical units, and home care. RTs perform diagnostic tests, administer a variety of treatments to promote pulmonary hygiene, manage mechanical ventilators and cardiovascular support, and direct pulmonary rehabilitation activities.

The baccalaureate degree Respiratory Care program includes three years of academic course work at NDSU and a 12-month professional phase or internship in the Respiratory Care Department at MeritCare Medical Center, Fargo, N.D.

Academic course work includes chemistry, physics, anatomy and physiology, microbiology, mathematics, psychology, and computer science. Each student also is required to complete a minimum of 12 credits of 300-400 level special elective courses on campus. Special elective courses should be closely related to the clinical

area in which the student wishes to specialize. A list of approved special elective courses is available from the RC advisor. Common specialty areas include neonatal/pediatric general or intensive care, adult general or intensive care, diagnostics, pulmonary rehabilitation, home care, education, and management. Specialty training within RC occurs at the end of the internship year (RC 494).

The internship consists of lecture, laboratory, and clinical education that prepare the student to enter the profession of respiratory care. Students are eligible to apply for one of the internships available each year at MeritCare during the semester they plan to complete all prerequisite courses on campus. Admission into the internship is selective and is based upon successful completion of all internship prerequisites (a minimum of 20 resident credits at NDSU for transfer students), grade point average, references, personal interview, and career motivation. Upon completion of the internship, graduates are eligible to write the national certifying examinations to obtain the certified and registered credentials.

## Recommended '06-07 Curriculum Respiratory Care Major

	Credits	
	F	S
<b>First Year</b>		
CHEM 121, 121L, General Chemistry I, Lab . . . . .	4	--
CHEM 122, 122L, General Chemistry II, Lab . . . . .	--	4
CSCI 114, Microcomputer Packages . . . . .	3	--
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 103, College Algebra . . . . .	3	3
MICR 202, 202L, Intro to Micro, Lab. . . . .	--	3
RC 111, Intro to Respiratory Care . . . . .	1	--
SOC 110, Intro to Sociology . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Totals . . . . .	15	13
<b>Second Year</b>		
BIOL 220, 220L, Hum/Anat/Physics I/Lab . . . . .	4	--
BIOL 221, 221L, Hum/Anat/Physics II/Lab . . . . .	--	4
CHEM 240, Survey of Organic Chemistry . . . . .	3	--
CHEM 260, Elements of Biochemistry . . . . .	--	4
COMM 110, Fund of Public Speaking . . . . .	3	--
HPER 210, First Aid & CPR . . . . .	2	--
PHYS 120, Fund of Physics . . . . .	--	3
PSYC 111, Intro to Psychology . . . . .	3	--
STAT 330, Intro to Statistics . . . . .	--	3
VETS 115, Med Term for the Para. . . . .	--	1
Totals . . . . .	15	15
<b>Third Year</b>		
<b>Summer Session</b>		
RC 496, Internship (12 months Including summer session) <sup>1</sup> . . . . .		40
<b>Fourth Year</b>		
RC 494, Individual Study . . . . .	4	--
Wellness course . . . . .	2	--
Special Electives <sup>2</sup> . . . . .	6	6
General Education/Electives . . . . .	--	6
Totals . . . . .	12	12
<b>Curriculum Total . . . . .</b>		<b>122</b>

<sup>1</sup> Credits earned at MeritCare Medical Center Respiratory Care Program.

<sup>2</sup> Each student will develop a specialty proposal in his/her own area of primary interest. Each specialty will consist of RC 494, Individual Study, four credits, plus a minimum of 12 additional academic credits at the 300-400 level or higher. A list of approved special elective courses is available from the respiratory care advisor. The specialty proposal will be developed in the latter part of the internship year and presented prior to completion of the internship to a respiratory care consortial committee, or its designates, for approval. Once approved, any changes must occur by petition to the consortial committee.



## Department of Nursing

[www.ndsu.edu/ndsu/nursing](http://www.ndsu.edu/ndsu/nursing)

### Nursing Major

The Nursing program is a four-year course of study leading to a Bachelor of Science in Nursing (B.S.N.) degree. Upon successful completion of the program, the graduate is eligible to apply for licensure as a registered nurse (R.N.). The nursing program is approved by the North Dakota Board of Nursing and is nationally accredited by the Commission on Collegiate Nursing Education (CCNE).

### Mission

The mission of the nursing department is to provide professional nursing education, to advance knowledge of the discipline, and to serve as a resource for the health care needs of society.

### Core Values

The faculty, students, and graduates of the department of nursing believe in the inherent worth and dignity of individuals and the value of professional nursing as an integral part of the health of society. We believe the core values of autonomy, caring, integrity, justice, professionalism and respect guide the scholarship of education, service, practice and research.

The role of faculty is to encourage, facilitate, and provide opportunities which support self-directed learning and critical thinking, enhance personal growth and socialize students as members of the profession. The role of students is to develop the knowledge, skills and attitudes essential to professional nursing practice and graduate study in nursing. The role of the graduates is to promote the health of society, advance the discipline, and function as responsible citizens of the nation and the world.

Nursing is an art and science. It is a practice profession and an academic discipline. The domain of nursing is the human response to actual or potential variations in human functioning and life processes. Nursing involves interactions among the nurse, the person and the environment in the prevention of disease, the promotion and restoration of health, and the comfort of the dying.

Professional nursing practice is the creative application of therapeutic nursing interventions based on a synthesis of scientific knowledge, research,

professional values and standards. Professional nurses work with individuals, families, communities and other aggregates to meet primary, secondary, and tertiary health care needs. Nurses practice independently, interdependently, and collaboratively in a variety of settings. Nurses balance career advancement, personal well-being, and fidelity to nursing's social contract.

Core values provide a framework that supports education for and practice of professional nursing as envisioned by the Department of Nursing.

**Caring** is the central concept of nursing. The competence, sensitivity and compassion that characterize professional caring, guide our behavior in faculty/student and nurse/client interactions. **Respect** is reflected by nurses' regard for human dignity and in our acceptance of the diversity of humankind. In our practice we demonstrate our respect for other disciplines through collegiality and collaboration.

**Autonomy** reflects a patient's right to make decisions about his/her health care and nurses' rights to make decisions about their professional practice. **Integrity** is manifested in our honesty with patients and the public, by adherence to standards of academic honesty, through our accountability for our actions, and through our provision of care based on practice standards.

The professional obligation to assure equal treatment and equal access to care is a facet of **justice**. Nurses have a professional responsibility to encourage legislation and policy development that advances nursing care and quality health care for all people. Nursing faculty has an obligation to ensure that students have the opportunity to participate in and contribute to an excellent learning environment. **Professionalism** encompasses a commitment to lifelong learning and professional development, participation in professional organizations and the political process, and adherence to professional values and regulations.

### Graduate Outcomes

The graduate of the North Dakota State University baccalaureate nursing program will:

1. Practice nursing in accordance with American Nurses Association Standards of Practice and Standards of Professional Performance.
2. Apply in nursing practice an understanding of the basic relationships among disease transmission, health

status, health policy, cultural influences and health care economics within the global community.

3. Apply quality improvement approaches in work as peers on multidisciplinary teams.

4. Use information technology and communicate effectively with clients, health care team members, policy makers and the public.

## Curriculum

The curriculum is organized according to a conceptual model that flows from the mission and values of the nursing program. The "Essentials of Baccalaureate Education" (American Association of Colleges of Nursing, 1998) and "The Standards of Nursing Practice" (American Nurses Association, 2004) served as guidelines for development of the curriculum. The content of the program increases in scope and complexity as the student progresses through the major.

## Application Procedures

1. The pre-nursing program (first two semesters) is open to all high school graduates who wish to pursue a nursing major. To enter the pre-nursing program, students must be admitted to the university. The nursing major begins the fall semester of the sophomore year.

2. For admission into the professional nursing program, an application must be submitted by June 1 to the Nursing Office, 136 Sudro Hall. Enrollment in the nursing major is limited. A minimum GPA of 3.0 (4.0 = A) is required in all post high school work.

Admission is competitive and based on all of the following: (a) cumulative GPA of at least 3.0, (b) selective GPA of at least 3.0 that incorporates selected prerequisite courses (see recommended curriculum), (c) completion of prerequisite courses with a passing grade, (d) eligibility for sophomore standing, (e) 2 references, (f) an interview if requested, (g) number of credits (up to 30) taken in the North Dakota State University System, and (h) advisor recommendation.

Students applying for a nursing major must submit the following:

1. Application to the professional major

2. Official transcripts from all colleges attended, including NDSU

3. Two reference forms

4. Evidence of pre-nursing status at NDSU.

The documents must be on file in the Nursing Office by June 1. Application forms may be obtained at the Nursing Office, 136 Sudro Hall, and the Office of Admission, 124 Ceres Hall, North Dakota State University, Fargo ND 58105. You may also call the Office of Admission at 231-8643 or 1-800-488-NDSU(6378). Students will be notified of their admission status by July 15.

Students enrolled at NDSU in the pre-nursing program should consult with their nursing faculty advisor prior to the application deadline.

For further information contact:

Department of Nursing  
136 Sudro Hall  
North Dakota State University  
Fargo, ND 58105  
Telephone (701)231-7395

## Recommended '06-07 Curriculum Nursing Major

	Credits	
	F	S
<b>First Year</b>		
CHEM 117, Chem Concepts & Appl . . . . .	3	--
CHEM 117L, Chem Concepts & Appl Lab . . . . .	1	--
CHEM 260, Elements of Biochemistry . . . . .	--	4
COMM 110, Fund of Public Speaking . . . . .	--	3
ENGL 120, College Composition II . . . . .	3	--
MICR 202, Intro to Microbiology . . . . .	--	2
MICR 202L, Intro to Microbiology Lab . . . . .	--	1
PSYC 111, Intro to Psychology . . . . .	--	3
Quantitative Reasoning . . . . .	3	--
SOC 110, Intro to Sociology <b>or</b>		
ANTH 111, Intro to Anthropology . . . . .	3	--
UNIV 189, Skills for Academic Success . . . . .	1	--
Humanities & Fine Arts Electives . . . . .	--	3
Totals . . . . .	14	16

### Second Year

BIOL 220, Human Anat & Physiology . . . . .	3	--
BIOL 220L, Human Anat & Physiology Lab . . . . .	1	--
BIOL 221, Human Anat & Physiology II . . . . .	--	3
BIOL 221L, Human Biol & Physiology II Lab . . . . .	--	1
HNES 250, Nutrition Science <b>or</b>		
NUTR 240, Prin of Nutrition . . . . .	--	3
NURS 240, Nursing as a Scholarly Profession* . . . . .	3	--
NURS 250, Health Promotion* . . . . .	2	--
NURS 251, Skills & Concepts for Nursing Practice* . . . . .	--	2
NURS 252, Gerontology Nursing* . . . . .	--	2
NURS 360, Health Assessment* . . . . .	--	4
PSYC 250, Developmental Psychology <b>or</b>		
CDFS 230, Life Span Development . . . . .	3	--
Cultural Diversity Elective . . . . .	3	--
Totals . . . . .	15	15

\* Must be accepted into nursing program to enroll in nursing courses.

### Third Year

NURS 340, Leadership & Ethical Reflection . . . . .	2	--
NURS 341, Found of Clinical Nursing . . . . .	3	--
NURS 342, Adult Health I . . . . .	5	--
NURS 352, Family Health I . . . . .	--	5
NURS 362, Family Health II . . . . .	--	4
NURS 430, Nursing Management . . . . .	--	2
PHRM 300, Prin of Clinical Pharmacology . . . . .	3	--
Upper Level English (300 Level) . . . . .	3	--
Humanities & Fine Arts Elective . . . . .	--	3
Elective . . . . .	--	3
Totals . . . . .	16	17

### Fourth Year

NURS 402, Mental Health Nursing . . . . .	5	--
NURS 403, Adult Health II . . . . .	5	--
NURS 404, Adult Health III . . . . .	--	4
NURS 406, Public Health Nursing . . . . .	--	4
NURS 440, Nursing Issues & Career Devel . . . . .	2	--
NURS 450, Nursing Synthesis & Practicum . . . . .	--	4
Elective . . . . .	--	3
Global Perspectives . . . . .	3	--
Totals . . . . .	15	15

**Curriculum Total . . . . . 122**

**Selected prerequisite courses:** The following courses must be completed prior to applying to the professional nursing major. The selected GPA is calculated on these courses.

COMM 110, Fundamentals of Public Speaking  
ENGL 120, College Composition II  
PSYC 111, Intro to Psychology  
SOC 110, Intro to Sociology **or**  
ANTH 111, Intro to Anthropology, and

**Completion of 11 credits (of the 19 credits required) in the science category:**

CHEM 117 & 117L, Chem Concepts & Applications & Lab

CHEM 260, Elements of Biochemistry

MICR 202 & 202L, Intro to Microbiol & Lab **or**

MICR 202 & 202L, Intro to Microbiol & Lab

BIOL 220 & 220L, Hum Anat & Physiol I & Lab

BIOL 221 & 221L, Hum Anat & Physiol II & Lab

Students must successfully complete all first and second year courses prior to entering the third year of the nursing curriculum.

Computer proficiency is expected before beginning the nursing program.

Students must meet the university's general education requirements as well as the curriculum requirements in effect at the time of entrance into program. Students should consult their faculty advisor about electives that may enhance their program of study. Because of limitations on class size, the typical student admitted to the nursing program has a selective GPA higher than 3.0.

**Disclaimer:** The recommended curriculum is subject to change based on nursing program development/planning. Students must consult with their nursing advisor to keep updated with the current curriculum.

## Department of Pharmacy Practice

[www.ndsu.edu/pharmacy](http://www.ndsu.edu/pharmacy)

### Pharmacy Major

Pharmacy programs encompass both the basic and clinical sciences and are designed to provide students with the knowledge, skills, and attitudes essential to the practice of pharmacy.

The current mission of pharmacy practice is to render pharmaceutical care. The goal of pharmaceutical care is to improve an individual patient's quality of life through achievement of definite, medication-related therapeutic outcomes. The outcomes sought are (a) cure of a disease, (b) elimination or reduction of symptoms, (c) arresting or slowing the disease process, or (d) preventing a disease or its symptoms. This, in turn, involves three major functions: (a) identifying potential and actual medication-related problems, (b) resolving actual medication-related problems, and (c) preventing potential medication-related problems. A medication-related problem is an event or circumstance involving medication therapy that actually or potentially interferes with an optimum outcome for a specific patient.

The six-year curriculum in pharmacy is conducted on a 2-4 basis. Students in the first two years of the program are in pre-pharmacy, and students in the final four years are in the professional program. Students entering the program in the first two years must meet general admission standards of the university. Students are admitted to the final four years on a competitive basis, and must meet specific admission requirements of the college. The program leads to a Doctor of Pharmacy degree (Pharm.D.). For admission requirements to the professional program, contact the dean's office of the college. Students attending other institutions must maintain frequent contact with the college to determine appropriate course work. The pre-pharmacy course work, the first two years, may be completed at other institutions if course work has been submitted for formal NDSU review and determined to be equivalent to NDSU requirements.

The current entry-level Pharm.D. curriculum is designed to provide the cultural and humanistic background needed to meet the demands of society today, as well as the professional education required for the practice of pharmacy. The Pharm.D. degree prepares the student to accept positions in community, hospital, managed care, clinical, and industrial pharmacy. Other potential opportunities include administrative positions in pharmaceutical companies and associations. Teaching and research positions in universities and the pharmaceutical industry are excellent opportunities for those with advanced training in pharmacy.

The college is a member of the American Association of Colleges of Pharmacy, and is accredited by the Accreditation Council for Pharmacy Education (ACPE).

### Recommended '06-07 Curricula Pre-Pharmacy Major

To be admitted to the Professional Pharmacy program, the applicant must have completed at least 65 semester hours of college or university credits, including the following:

	<i>Credits</i>	
<i>First Year</i>	<i>F</i>	<i>S</i>
BIOL 150, 150L, General Biology I, Lab . . . . .	4	--
CHEM 121, 121L, General Chemistry I, Lab . . . . .	4	--
CHEM 122, 122L, General Chemistry II, Lab . . . . .	4	--
COMM 110, Fund of Public Speaking . . . . .	--	3
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 146, 147, Applied Calculus I, II . . . . .	4	4
UNIV 189, Skills for Academic Success . . . . .	1	--
Wellness . . . . .	--	2
Totals . . . . .	16	16

**Second Year**

MICR 202, 202L, Intro to Microbiology, Lab . . . . .	3	--
BIOL 220, 220L, Human Anatomy/Phys I, Lab . . . . .	4	--
BIOL 221, 221L, Human Anatomy/Phys II, Lab . . . . .	4	--
CHEM 341, 341L, Organic Chemistry I, Lab . . . . .	4	--
CHEM 342, Organic Chemistry II . . . . .	--	3
ECON 105, Elements of Economics or		
ECON 201, Prin of Microeconomics . . . . .	3	--
PHYS 120, Fund of Physics . . . . .	3	--
Humanities & Fine Arts Electives . . . . .	--	6
Social & Behavioral Sciences Electives . . . . .	3	--
Totals . . . . .	17	16

Students attending other institutions must be aware of the General Education requirements when enrolling in course work.

This curriculum is subject to periodic changes. Students should maintain frequent contact with the college to determine appropriate course work.



### Professional Pharm.D. Major

<i>P1- Fall</i>	<i>Credits</i>
BIOC 460, Biochemistry I . . . . .	4
MICR 470, Basic Immunology . . . . .	3
PSCI 340, Pathophysiology I . . . . .	4
PSCI 368, Pharmaceutics I . . . . .	4
PHRM 351, Pharmaceutical Care I . . . . .	2
Totals . . . . .	17

<i>P1- Spring</i>	<i>Credits</i>
BIOC 461, Biochemistry II . . . . .	4
PSCI 341, Pathophysiology II . . . . .	4
PSCI 369, Pharmaceutics II . . . . .	3
PSCI 411, Pharmacodynamics I . . . . .	3
PHRM 352, Pharmaceutical Care II . . . . .	2
Total . . . . .	16
<b>Fall/Spring Total . . . . .</b>	<b>33</b>

<i>P2- Fall</i>	<i>Credits</i>
MICR 460/561, Pathogenic/Pharm Lab . . . . .	3/1
PSCI 414, Pharmacodynamics IV . . . . .	3
PSCI 415, Pharmacodynamics V . . . . .	3
PSCI 416, Pharmacodynamics VI . . . . .	3
PHRM 452, Pharmaceutical Care . . . . .	2
PHRM 471, Clinical Pharmacokinetics . . . . .	2
Total . . . . .	17

<i>P2- Spring</i>	<i>Credits</i>
PSCI 412, Pharmacodynamics II . . . . .	3
PSCI 413, Pharmacodynamics III . . . . .	3
PSCI 470, Pharmaceutics III . . . . .	3
PHRM 451, Pharmaceutical Care . . . . .	2
PHRM 480, Drug Lit. Evaluation . . . . .	3
PHRM 475, Pharmacy Management . . . . .	3
Total . . . . .	17
<b>Fall/Spring Total . . . . .</b>	<b>34</b>

<i>P3- Fall</i>	<i>Credits</i>
PHRM 520, Pediatrics-Geriatrics . . . . .	2
PHRM 535, Neoplastic Diseases . . . . .	2
PHRM 536, Neurology/Psychiatry . . . . .	3
PHRM 537, Renal/Fluid & Electrolyte . . . . .	3
PHRM 552, Pharmaceutical Care . . . . .	2
Free Elective . . . . .	1-3
Total . . . . .	14-15

<i>P3- Spring</i>	<i>Credits</i>
PHRM 534, Rheum/Endo/Repro . . . . .	2
PHRM 532, Infectious Disease . . . . .	3
PHRM 538, Cardiovascular & Pulmonary . . . . .	4
PHRM 551, Pharmaceutical Care . . . . .	2
PHRM 558, GI/Nutrition . . . . .	2
PHRM 572, Pharmacy Law . . . . .	2
Free Elective . . . . .	1-3
Total . . . . .	16-17
<b>Fall/Spring Total . . . . .</b>	<b>31</b>

<i>P4- Fall/Spring</i>	<i>Credits</i>
45-Week Experiential Training Program <sup>1,2</sup> . . . . .	--
PHRM 581, Clin Clerkship I . . . . .	15
PHRM 582, Clin Clerkship II . . . . .	15
PHRM 583, Clin Clerkship III . . . . .	15
<b>Fall/Spring Total . . . . .</b>	<b>45</b>
<b>Curriculum Totals . . . . .</b>	<b>143</b>

<sup>1</sup> Students assigned by rotation.  
<sup>2</sup> Sites located in Fargo and other areas.

# COLLEGE OF SCIENCE AND MATHEMATICS

[www.ndsu.edu/scimath](http://www.ndsu.edu/scimath)

Stevens Hall 201 (701) 231-7411

Kevin D. McCaul, Dean

Opportunities in the college reflect the belief that an understanding of the methods and findings of science is best achieved through first-hand experience in the process of conducting, analyzing, and reporting research. Students are encouraged to participate in this process by working closely with faculty and other students in laboratory and field research, thus gaining direct knowledge of the power, limits, and problems in scientific inquiry. These opportunities for direct experience with the tools of the scientist are liberally available to the interested and motivated student.

## Departments of the College of Science and Mathematics include the following:

- Biological Sciences
- Chemistry and Molecular Biology
- Coatings and Polymeric Materials
- Computer Science
- Geosciences
- Mathematics
- Physics
- Psychology
- Statistics

## Degree Programs

The College of Science and Mathematics provides undergraduate programs leading to a Bachelor of Science or Bachelor of Arts degree. Graduate programs at the master's and doctoral levels also are offered. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

## Degree Requirements

All majors are required to complete departmental and general education requirements. Departmental requirements for graduation are those in existence at the beginning of the junior year. Junior standing, in this case, applies only to majors who have satisfied the freshman and sophomore curriculum of a departmental program. Available majors include the following:

- Behavioral Statistics
- Biochemistry and Molecular Biology
- Biological Sciences
- Biotechnology
- Botany
- Chemistry
- Computer Science
- Geology
- Mathematics
- Natural Resources Management
- Physics
- Psychology
- Statistics
- Zoology

Minors are available in most departments.

Courses to fulfill the major requirements in the college may not be taken pass/fail. Only elective courses outside the major may be taken pass/fail.

Course work transferring from another institution with a grade of D will count toward total number of credits, but not toward specific degree requirements.

Math 101 and 102 are developmental courses and will not count toward credits for graduation in any program.



## General Education

College general education requirements for the two undergraduate degrees extend beyond the minimum university general education requirements. The college requires an additional six credits in humanities and/or social sciences for the Bachelor of Science degree and an additional 12 credits for the Bachelor of Arts degree. This requirement may be fulfilled by any course having the following prefix: ADFH, ANTH, ARCH, ART, CDFS, CJ, CLAS, COMM, ECON, ENGL, FREN, GEOG, GERM, HIST, HUM, LA, LANG, MUSC, PHIL, POLS, PSYC, RELS, SOC, SPAN, THEA, WS, or any course from the approved list of general education courses in humanities and social sciences (general education categories 4 and 5). These credits must come from outside the department of the student's major. An advisor should be consulted for specific courses. Students also are encouraged to follow their own interests in choosing electives that go beyond the minimum requirements. Basic requirements for each degree include the following:

## Bachelor of Science Degree

	<i>Credits</i>
COMM 110, Fund of Public Speaking . . . . .	3
ENGL 110, 120, College Composition I, II <sup>2</sup> . . . . .	6
UNIV 189, Skills for Academic Success . . . . .	1
Humanities & Fine Arts1 . . . . .	6
Humanities & Social Sciences (additional college requirement) <sup>1</sup> . . . . .	6
Quantitative Reasoning <sup>1</sup> . . . . .	3
Science & Technology <sup>1</sup> . . . . .	10
Social & Behavioral Sciences <sup>1</sup> . . . . .	6
Wellness1 . . . . .	2

<sup>1</sup> Refer to [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar) for courses approved for General Education.

<sup>2</sup> Effective fall 2007, students entering NDSU will be required to complete an upper-level, writing-intensive course as part of the general education requirements.

## Bachelor of Arts Degree

B.A. degree requirements are the same as the B.S. degree with an additional six credits of humanities or social and behavioral sciences and the addition of two years of a modern foreign language. This means completion of the second year of college-level language or the equivalent. For example, students with two or

three years of a foreign language in high school should enter second year college-level language. Students with four or more years of a foreign language in high school will be considered to have completed this requirement. All degree candidates must apply for graduation through the Office of Registration and Records according to university procedures and deadlines.

## Specializations

Specializations are provided for career preparation in a range of areas.

## Pre-Professional Programs

Pre-professional curricula are offered by a number of departments for students interested in preparing for careers in medicine, dentistry, mortuary science, chiropractic, optometry, osteopathy, and other health related fields. Most pre-professional programs are flexible and can be developed around many different majors. Departments that have expressed a special interest in advising pre-professional majors include biological sciences, chemistry and molecular biology, physics and psychology.

In addition to the preceding, a number of departments have developed other specializations to meet today's rapidly changing job markets. These may be found in the individual department sections as follows:

**Biological Sciences:** environmental science, biotechnology, biological sciences education, comprehensive science education, wildlife and fisheries biology, cell biology/physiology

**Chemistry:** biochemistry, biotechnology, chemistry education, pre-professional chemistry, coatings and polymeric materials

**Geosciences:** geochemistry

**Psychology:** natural science track, social sciences track, options in behavioral neuroscience, industrial-organizational, human services, and experimental

## Teacher Certification

Several of the majors available through the College of Science and Mathematics lead to careers in teaching.

Students may complete the requirements for a major in the college, then apply for admission to the School of Education in the College of Human Development and Education to undertake the additional requirements necessary to qualify for teacher certification. Alternatively, students may initially select a science and mathematics education curriculum through the School of Education.

Programs leading to teacher certification are available in the following areas: biological sciences, chemistry, comprehensive science, geology, mathematics, and physics.

Students interested in teacher education are encouraged to declare a double major in their discipline and in education (i.e., chemistry education and chemistry). Such double majors may typically be earned by successful completion of a few additional credits. Students should contact their advisors for details, and are encouraged to declare their primary and secondary majors with the Office of Registration and Records, 110 Ceres.

### Pre-Medicine and Pre-Dentistry

The suggested program will meet the requirements of most medical and dental schools. In general, these requirements include organic chemistry, physics, and the equivalent of a year of general biology. Some college-level mathematics, such as MATH 146-147, is strongly recommended. The Bachelor of Arts degree program is recommended. Contact the Department of Biological Sciences for additional information (231-8421).

### Pre-Medicine and Pre-Dentistry Requirements

	<i>Credits</i>
English & Speech Communication	9
Foreign Language	12
Humanities & Social Sciences	28*
Major	30*
Sciences & Mathematics	32
Skills for Academic Success	1
Wellness	2
Electives	10
Total	124

\* Approximate number of credits in this subject area.

### Interdisciplinary Programs

The College of Science and Mathematics participates in the following undergraduate interdisciplinary programs. For further information, refer to the Interdisciplinary Programs section.

### Biotechnology Major

[www.ag.ndsu.nodak.edu/plantsci](http://www.ag.ndsu.nodak.edu/plantsci)

Biotechnology is an interdisciplinary field based on a combination of biology and technology. It includes the application of science and technology to the design of new plants, animals, and microorganisms that have improved characteristics.

### Natural Resources

#### Management Major

[www.ag.ndsu.nodak.edu/nrm](http://www.ag.ndsu.nodak.edu/nrm)

This interdisciplinary program is available through the College of Science and Mathematics' Biological Sciences and Geosciences departments and the School of Natural Resources.

### Cooperative Education

Cooperative Education, a program of the Career Center, offers undergraduate and graduate students an opportunity to integrate classroom study with paid, career-related work experience for academic credit. Work may be full or part time. Credit is granted through Continuing Education and awarded directly by the Cooperative Education program. A

Cooperative Education experience may substantially improve students' employment opportunities after graduation. Students may obtain one or two semesters of professional work experience related to their studies; however, no more than a total of three credits may be applied to the minimum of 122 credits required for the degree. Each department has specific requirements for earning these credits. The student must have approval of the department chair prior to beginning the Cooperative Education program.

## Department of Biological Sciences

<http://biology.ndsu.nodak.edu>

The Department of Biological Sciences offers broad undergraduate preparation in the basic concepts and principles of the life sciences with major emphasis on both plant and animal forms. Various curricular options are available for specific career interests. It is important for students to consult frequently with their advisors regarding the proper options and courses related to their special interests. In addition, students should correspond early with professional or graduate schools to make sure they satisfy specific requirements.

### Biological Sciences Major

The Biological Sciences major is available for the student seeking broad biological training. Required courses for this curriculum include the following:

BIOL 150, 150L, 151, 151L, 364, 459, 491
BOT 315, 315L, 372
CHEM 121, 121L, 122, 122L, with 240 and CHEM 260 <i>or</i>
CHEM 341, 341L, 342 and BIOC 460
MATH 146
PHYS 211, 211L and 212, 212L
STAT 330
ZOO 370
One three-credit course in computer science
Two courses in earth science

Advanced biology electives (12 credits, including two botany and two zoology courses) with at least one course from each of the following areas: systematics, anatomy/morphology, and physiology.

A student is expected to take approximately an equal number of credits in botany and zoology with the distribution of course work in the two fields determined by the student in consultation with his/her advisor.

A list of courses that meet the required categories of systematics, anatomy/morphology, physiology, computer science, and earth sciences may be obtained from the departmental office. Curricula for secondary school biological sciences education, comprehensive science education, environmental studies, traditional course sequences, and pre-professional programs are available in the department. Graduate work in biology is offered at the Master of Science level.

Students interested in majoring in a specific biological science (animal science, botany, entomology, horticulture, microbiology, plant pathology, or zoology) should consult the appropriate discipline.

### Environmental Science Option

For students interested in careers that address solving environmental problems, there is the Biological Sciences major with an Environmental option. This rigorous option incorporates balanced studies in the natural sciences (biology, chemistry, physics, and earth sciences) with social sciences (economics, political science, and sociology). It also involves technology, business, law, ethics, and human relations and behavior. Students interested in this option should visit with an advisor to obtain the specific requirements.

### Biological Sciences Minor

A minor in Biological Sciences consists of at least 18 credits, including BIOL 150, 150L, 151, 151L, BOT 372, and elective credits selected from 300- and 400-level courses in biology, botany, or zoology. The chair of the Department of Biological Sciences must approve elective credits.

### Recommended '06-07 Curriculum Biological Sciences Major

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
BIOL 150, 150L, 151, 151L,		
General Biology I, II, Labs	3,1	3,1
CHEM 121, 121L, 122, 122L,		
General Chemistry I, II, Labs	3,1	3,1
ENGL 110, 120, College Composition I, II	3	3
MATH 146, Applied Calculus I	4	--
UNIV 189, Skills for Academic Success	1	--
Computer Science	--	3
Wellness	--	2
Totals	16	16

### Second Year

BIOL 364, General Ecology	--	3
BOT 315, 315L, Genetics, Lab	3,1	--
CHEM 341, 341L, 342, Organic		
Chemistry I, II, Lab	3,1	3
COMM 110, Fund of Public Speaking	--	3
STAT 330, Intro Statistics	--	3
BOT 372, Struct & Diversity Plants & Fungi	4	--
Social Science	3	3
Totals	15	15

### Third Year

BIOC 460, Found/Biochem/Molec Biology I	4	--
PHYS 211, 211L, 212, 212L,		
College Physics I, II & Labs	3,1	3,1
ZOO 370, Cell Biology	--	3
Biological Science	3	3
Earth Science	3	3
Humanities & Fine Arts	--	3
Totals	14	16

### Fourth Year

BIOL 459, Evolution	--	3
BIOL 491, Senior Seminar	--	2
Biological Sciences	6	6
Humanities & Fine Arts	3	--
Humanities or Social Sciences Electives	3	3
Electives	4	--
Totals	16	14

**Curriculum Total** ..... 122

### Recommended '06-07 Curriculum Environmental Science Option

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
BIOL 150, 150L, 151, 151L,		
General Biology I, II, Labs	3,1	3,1
CHEM 121, 121L, 122, 122L,		
General Chemistry I, II, Labs	3,1	3,1
ENGL 110, 120, College Composition I, II	3	3
MATH 146, 147, Applied Calculus I, II	4	4
UNIV 189, Skills for Academic Success	1	--
Totals	16	15

### Second Year

BIOL 315, 315L, Genetics, Lab	--	3,1
BOT 372, Struct & Divers Plants & Fungi	4	--
CHEM 341, 341L, 342, Org		
Chem I, II, Lab	3,1	3
GEOL 105, 105L, Physical Geology, Lab	3,1	--
GEOL 106, 106L, Earth Through Time, Lab	--	3,1
PHYS 211, 211L, 212, 212L,		
College Physics I, II, Labs	3,1	3,1
Totals	16	15



	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Third Year</b>		
BIOL 364, General Ecology	--	3
COMM 110, Fund of Public Speaking	.3	--
GEOL 428, Geochemistry	--	3
SOIL 217, Meteorology/Climatology	--	3
STAT 330, Intro Statistics	.3	--
Biological Sciences	.3	3
Computer Science	.3	--
General Education	3-6	3
Totals	15-18	15

<b>Fourth Year</b>		
BIOC 460, Found/Biochem/Molec Biology I	.4	--
BIOL 459, Evolution	--	3
BIOL 491, Seminar	--	2
SOIL 410, Soil & the Environment	--	2
Biological Sciences	.3	3
General Education	.6	3
Wellness	2-3	--
Totals	15-16	13

**Curriculum Total.** 122

### Biological Sciences and Comprehensive Science Education Majors

To meet requirements of the "No Child Left Behind" Act of 2001, students interested in Biological Sciences Education or Comprehensive Science Education are encouraged to declare a double major in the discipline and in education (i.e., Biological Sciences Education and Biological Sciences). Such double majors may typically be earned by successful completion of a few additional credits. Students should contact their advisors or the Office of Registration and Records for details, and are encouraged to declare their primary and secondary majors with the Office of Registration and Records, Ceres 110.

Students who intend to teach biology in the secondary schools should make their intentions known to the School of Education and consult with a biology education advisor in the Department of Biological Sciences early in their programs to make certain that they have a well-designed program and take the professional education courses required for state teacher certification.

The Comprehensive Science Education major is designed to prepare the secondary general science teacher. This major is an especially good preparation for students who may find themselves teaching several different science courses. Information about curriculum and other requirements is available from the School of Education and the education advisor in the Department of Biological Sciences.

### Recommended '06-07 Curriculum Biological Sciences Education Major

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
BIOL 150, 150L, 151, 151L,		
General Biology I, II, Labs	.3,1	3,1
CHEM 121, 121L, 122, 122L,		
General Chemistry I, II, Labs	.3,1	3,1
ENGL 110, 120, College Composition I, II	.3	3
HD&E 120, Orientation to HD&E	.1	--
HD&E 189, Skills for Academic Success	.1	--
MATH 146, Applied Calculus I	.4	--
Computer Science	--	3
EDUC 321, Intro to Teaching	--	3
Totals	17	17

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Second Year</b>		
BIOL 315, 315L, Genetics, Lab	.3,1	--
BOT 372, Struct & Diversity Plants & Fungi	.4	--
CHEM 240, Survey of Organic Chemistry	.3	--
CHEM 260, Elements of Biochemistry	--	4
COMM 110, Fund of Public Speaking	.3	--
BIOL 124, 124L, Environmental		
Science, Lab	.3,1	--
EDUC 322, Educational Psychology	--	3
EDUC 381, Early Experience	.1	--
PHYS 211, 211L, 212, 212L,		
College Physics I, II, Labs	.3,1	3,1
Wellness Elective	--	2
Humanities or Social/Behavioral Science	--	3
Totals	19	20

<b>Third Year</b>		
BIOL 364, General Ecology	--	3
BIOL 459, Evolution	--	3
EDUC 389, Native Am/Inst Pract	--	3
EDUC 451, Inst Planning/Strategies	.3	--
GEOL 105, 105L, Physical Geol, Lab	.3,1	--
GEOL 106, 106L, Earth Through Time, Lab	.3,1	--
STAT 330, Intro Statistics	.3	--
BIOL 220, 220L, Anatomy/Physiology, Lab	.3,1	--
BIOL 221, 221L, Anatomy/Physiology Lab	.3,1	--
ZOO 370, Cell Biology	--	3
Social & Behavioral Sciences	.3	--
Totals	17	20

<b>Fourth Year</b>		
BIOL 491, Seminar	--	--
EDUC 481, Classroom Pract/Sci Methods	.3	--
EDUC 485, Student Teaching Seminar	--	1
EDUC 486, Classroom Management	.3	--
EDUC 487, Student Teaching	--	12
Biology Electives	.6	--
Humanities & Fine Arts	.3	--
Humanities or Social/Behavioral Sciences	.3	--
Totals	20	13
<b>Curriculum Total.</b>		<b>141</b>

### Recommended '06-07 Curriculum Comprehensive Science Education Major

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
BIOL 124, 124L, Environmental Sci, Lab	.3,1	--
CHEM 121, 121L, 122, 122L,		
General Chemistry I, II, Labs	.3,1	3,1
ENGL 110, 120, College Composition I, II	.3	3
GEOL 105, 105L, Physical Geol, Lab	.3,1	--
GEOL 106, 106L, Earth Through Time, Lab	.3,1	--
HD&E 120, Orientation to HD&E	.1	--
HD&E 189, Skills for Academic Success	.1	--
Humanities & Fine Arts	--	3
Social & Behavioral Sciences	--	3
Wellness	.2	--
Totals	19	17

<b>Second Year</b>		
BIOL 150, 150L, 151, 151L,		
General Biology I, II, Labs	.3,1	3,1
CHEM 341, 341L, 342, 342L,		
Organic Chemistry I, II, Labs	.3,1	3,1
EDUC 321 Intro to Teaching	.3	--
EDUC 322, Educational Psychology	--	3
MATH 165, 166, Calculus I, II	.4	4
Wellness Elective	--	2
EDUC 381, Early Experience	.1	--
Totals	16	17

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Third Year</b>		
CHEM 260, Elements of Biochemistry	--	4
COMM 110, Fund of Public Speaking	--	3
EDUC 389, Native Am/Inst Pract	--	3
EDUC 451, Inst Planning/Strategies	.3	--
PHYS 251, 251L, 252, 252L, Univ		
Phys I, II, Labs	5,1	4,1
BOT 372, Struct & Diversity Plants & Fungi	.4	--
BIOL, BOT, or ZOO Elective (300+ level)	.3	--
STAT 330, Intro Statistics	.3	--
Computer Science	.3	--
Totals	19	18

<b>Fourth Year</b>		
EDUC 481, Classroom Pract/Sci Methods	.3	--
EDUC 485, Student Teaching Seminar	--	1
EDUC 486, Classroom Management	.3	--
EDUC 487, Student Teaching	--	12
PHYS 110, Intro Astronomy	.3	--
BIOL, BOT, or ZOO Elective (300+ level)	.3	--
Humanities & Fine Arts	.3	--
Social & Behavioral Sciences	.3	--
Totals	18	13
<b>Curriculum Total.</b>		<b>135</b>

### Botany Major

Departmental instruction is offered in the major areas of botany for students in all colleges of the university, but botany courses and instructional procedures are specially designed for undergraduate and graduate students in the College of Science and Mathematics and the College of Agriculture, Food Systems, and Natural Resources. Completion of an undergraduate major prepares the students for graduate work or for professional employment. Graduate work in botany is offered at both the M.S. and Ph.D. levels.

The Botany major requires a minimum of 25 credits in botany, plus additional credits in related fields. Required courses include the following:

- BIOL 150/150L, 151/151L, 315/315L, 459
- BOT 314, 372, 380, 460, 471 or 472, 491
- CHEM 121/121L, 122/122L, 240 and 260 or CHEM 341/341L, 342 and BIOC 460
- MATH 146
- MICR 350/350L
- PHYS 211/211L and 212/212L
- STAT 330
- ZOO 370
- One course in computer science

### Botany Minor

A minor in Botany also is available. Contact the department for details.

### Recommended '06-07 Curriculum Botany Major

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
BIOL 150, 150L, 151, 151L,		
General Biology I, II, Labs	.3,1	3,1
CHEM 121, 121L, 122, 122L,		
General Chemistry I, II, Labs	.3,1	3,1
ENGL 110, 120, College Composition I, II	.3	3
MATH 146, Applied Calculus I	.4	--
UNIV 189, Skills for Academic Success	.1	--
Computer Science	--	2-3
Wellness	--	2-3
Totals	16	15-17

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Second Year</b>		
BOT 315, 315L, Genetics, Lab . . . . .	--	3,1
BOT 314, Systematic Botany . . . . .	--	3
CHEM 341, 341L, 342, Organic Chemistry I, II, Lab . . . . .	3,1	3
PHYS 211, 211L, College Physics I, Lab . . . . .	3,1	--
PHYS 212, 212L, College Physics II, Lab . . . . .	--	3,1
BOT 372, Struct & Diversity/Plants & Fungi . . . . .	4	--
Humanities & Fine Arts . . . . .	--	3
Social & Behavioral Sciences . . . . .	--	3
Totals . . . . .	15	17

<b>Third Year</b>		
BIOC 460, Found/Biochem/Molec Biology I . . . . .	4	--
BOT 380, 380L, Plant Physiology/lab . . . . .	3,1	--
BOT 452, Plant Structure . . . . .	3	--
COMM 110, Fund of Public Speaking . . . . .	3	--
STAT 330, Intro Statistics . . . . .	--	3
Botany Electives . . . . .	--	6
Humanities & Fine Arts . . . . .	--	3
Social & Behavioral Sciences . . . . .	--	3
Totals . . . . .	14	15

<b>Fourth Year</b>		
BIOC 459, Evolution . . . . .	--	3
BOT 460, Plant Ecology . . . . .	3	--
BOT 471 or 472, Phycology or Lichenology . . . . .	3	--
BOT 491, Seminar . . . . .	--	2
MICR 350, 350L, General Microbiology, Lab . . . . .	3,1	--
ZOO 370, Cell Biology . . . . .	--	3
Humanities & Fine Arts . . . . .	--	3
Social & Behavioral Science . . . . .	3	--
Electives . . . . .	3	3
Totals . . . . .	16	14

**Curriculum Total . . . . . 122**

### Zoology Major

Minimum requirements for the Zoology major include 42 credits of biological sciences, of which 14 are "core" credits in zoology and biology. An additional 21 to 26 credits fulfill one of three options including courses in chemistry, physics, mathematics, and statistics. The 42 credits for the major are completed with elective zoology courses. College and university general education requirements constitute the remainder of the curriculum.

Zoology major "core" course requirements include the following:

- BIOC 150-150L, General Biology I, Lab
- BIOC 151, 151L, General Biology II, Lab
- ZOO 315-315L, Genetics, Lab
- ZOO 491, Seminar

Students may pursue their personal and career interests through one of the following options in zoology.

**Option 1: General Zoology.** This option includes more elective choices than the other options and is designed for students who wish to pursue an area not represented in the other two options.

**Option 2: Physiology, Cell Biology, or Health Sciences.** This option is designed for students who are interested in physiology or cell and molecular biology or who plan to enter medical, dental, optometry, or chiropractic school.

**Option 3: Fisheries, Wildlife, Ecology, and Behavior.** This option is designed for students who are interested in fisheries management, ecology, conservation, natural resource management, or behavior.

Option requirements include one or more courses from each concept category as indicated in the table. (Contact the department for more specific information.)

A grade-point average of 2.0 is required for courses taken to fulfill the 42 credits in the major. A maximum of two credits of Individual Study (494) and/or Field Experience (496) and a maximum of two credits in Seminar (491) may apply to the 42 credits required for the major. All credits taken may apply toward those required for graduation. Graduate work in zoology is offered at both the M.S. and Ph.D. levels.

Sample curricula for the options in zoology are presented to illustrate a typical sequence in which zoology core courses and supporting courses in other areas may be planned. These sequences are meant only to be a guide; other models or pathways are certainly possible.

### Recommended '06-07 Curriculum Option 1: General Zoology Major

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
BIOC 150, 150L, 151, 151L		
General Biology I, II, Labs . . . . .	3,1	3,1
CHEM 121, 121L, 122, 122L		
General Chemistry I, II, Labs . . . . .	3,1	3,1
COMM 110, Fund of Public Speaking . . . . .	--	3
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 146, Applied Calculus I . . . . .	4	--
UNIV 189, Skills for Academic Success . . . . .	--	1
Wellness . . . . .	--	2
Totals . . . . .	16	16

<b>Second Year</b>		
BIOC 364, General Ecology <b>or</b>		
ZOO 360, Animal Behavior . . . . .	--	3
BOT 372, Struct&Diversity of Plants & Fungi . . . . .	4	--
CHEM 341, 341L, Organic Chemistry I, Lab . . . . .	3,1	--
STAT 330, Intro Statistics . . . . .	--	3
ZOO 315, 315L, Genetics, Lab . . . . .	4	--
ZOO 280, Comp Chor Morph <b>or</b>		
ZOO 482, Developmental Biology . . . . .	3 or 4	--
General Education Requirements . . . . .	0-3	6-9
Totals . . . . .	15-19	12-15

<b>Third Year</b>		
PHYS 120, Fund of Physics . . . . .	3	--
ZOO 370, Cell Biology <b>or</b>		
ZOO 380, Vertebrate Histology . . . . .	3	or 3
ZOO 450, Invertebrate Zoology . . . . .	--	4
ZOO 460, Animal Physiology <b>or</b>		
ZOO 462, Physiological Ecology . . . . .	3	or 3
Zoology Electives . . . . .	3-4	3-4
Electives . . . . .	6	3-6
Totals . . . . .	12-15	14-16

<b>Fourth Year</b>		
ZOO 491, Seminar . . . . .	2	or 2
Biodiversity Elective . . . . .	3	or 3
Zoology Electives . . . . .	3-4	3-4
Electives . . . . .	8-12	8-12
Totals . . . . .	16	16
<b>Curriculum Total . . . . . 122</b>		

### Recommended '06-07 Curriculum Option 2: Physiology, Cell Biology, or Health Sciences

This option is designed to meet the requirements for most professional schools (medical, dental, optometric, chiropractic, and osteopathic) and graduate programs in physiology and cell biology. The emphasis is on additional course work in cell biology, physiology, chemistry, and physics.

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
BIOC 150, 150L, 151, 151L,		
General Biology I, II, Labs . . . . .	3,1	3,1
CHEM 121, 121L, 122, 122L		
General Chemistry I, II, Labs . . . . .	3,1	3,1
COMM 110, Fund of Public Speaking . . . . .	--	3
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 146, Applied Calculus I . . . . .	4	--
UNIV 189, Skills for Academic Success . . . . .	--	1
Wellness . . . . .	--	2
Totals . . . . .	16	16

<b>Second Year</b>		
BIOC 364, General Ecology <b>or</b>		
ZOO 360, Animal Behavior . . . . .	--	3
CHEM 341, 341L, Organic Chem I, Lab . . . . .	3,1	--
CHEM 342, 342L, Organic Chem II, Lab . . . . .	--	3,1
STAT 330, Intro Statistics . . . . .	--	3
ZOO 280, Comp Chor Morph . . . . .	--	4
ZOO 315, 315L, Genetics, Lab . . . . .	3,1	--
General Education Requirements . . . . .	7	2-3
Totals . . . . .	15	16-17

<b>Third Year</b>		
BIOC 460, Found Biochem & Mol Biol I . . . . .	4	--
PHYS 211, 211L, College Physics I, Lab . . . . .	3,1	--
PHYS 212, 212L, College Physics II, Lab . . . . .	--	3,1
ZOO 370, Cell Biology . . . . .	--	3
ZOO 460, Animal Physiology . . . . .	--	3
General Education Requirements . . . . .	6	6
Zoology Elective . . . . .	3-4	--
Totals . . . . .	17-18	16

<b>Fourth Year</b>		
ZOO 462, Physiological Ecology <b>or</b>		
ZOO 464, Endocrinology . . . . .	3	--
ZOO 491, Seminar . . . . .	2	or 2
Biodiversity Elective . . . . .	3	or 3
Cell Biology Elective . . . . .	3-4	--
Zoology Elective . . . . .	--	3-4
Electives . . . . .	6-12	6-12
Totals . . . . .	15	15
<b>Curriculum Total . . . . . 122</b>		

### Recommended '06-07 Curriculum Option 3: Fisheries, Wildlife, Ecology, and Behavior

Courses focused on invertebrates, fish, amphibians, reptiles, birds, mammals, ecology, management, animal behavior, and population dynamics are added to the "core" courses. In addition, a course in physiology and a course in morphology are required. These studies prepare the student for research or management positions with federal, state, or other agencies such as the U.S. Fish and Wildlife Service, State Game and Fish Departments, State Conservation Departments, U.S. and State Forest Services, U.S. Bureau of Land Management, Natural Resources Conservation Service, and the Environmental Protection Agency, as well as national and state parks.

A wildlife or fisheries biologist participates in a wide range of activities including natural history, systematics, aquatic and terrestrial ecology, population dynamics, management techniques, pollution biology, and public relations. Some positions require advanced training at the master's (M.S.) or doctoral (Ph.D.) level. In addition to the curriculum suggested, at least one summer or semester of field experience is recommended. Credits for field experience may be gained either at a biological field station or through employment approved by the advisor.

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year</b>		
BIOL 150, 150L, 151, 151L, General Biology I, II, Labs . . . . .	3,1	3,1
CHEM 121, 121L, 122, 122L, General Chemistry I, II, Labs . . . . .	3,1	3,1
COMM 110, Fund of Public Speaking . . . . .	--	3
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 146, Applied Calculus I . . . . .	4	--
UNIV 189, Skills for Academic Success . . . . .	1	--
Wellness . . . . .	--	2
Totals . . . . .	16	16

<b>Second Year</b>		
BIOL 364, General Ecology . . . . .	--	3
BOT 372, Struct & Diversity Plants & Fungi . . . . .	4	--
CHEM 240, Survey Organic Chemistry . . . . .	3	--
CSCI 114, Microcomputer Packages . . . . .	--	3
STAT 330, Intro Statistics . . . . .	--	3
ZOO 280, Comp Chor Morph . . . . .	--	4
ZOO 315, 315L, Genetics, Lab . . . . .	3,1	--
General Education Requirements . . . . .	6	3
Totals . . . . .	17	16

<b>Third Year</b>		
BOT 314, Systemic Botany . . . . .	--	3
PHYS 120, Fund of Physics . . . . .	3	--
ZOO 462, Physiological Ecology . . . . .	3	--
Biodiversity Elective . . . . .	3	or 3-4
General Education Requirements . . . . .	5	6
Management Elective . . . . .	3	6
Totals . . . . .	17	18-19

<b>Fourth Year</b>		
ZOO 491, Seminar . . . . .	2 or 2	
Biodiversity Elective . . . . .	3	or 3-4
Botany Elective <sup>1</sup> . . . . .	3	or 3
Ecology/Behavior Elective . . . . .	3	or 3
Management Elective . . . . .	3	or 3
Zoology Electives . . . . .	3-4	or 3-4
Electives . . . . .	0-15	0-15
Totals . . . . .	16	17

**Curriculum Total . . . . . 122**

<i>Concept Categories</i>	<i>Opt. 1</i>	<i>Opt. 2</i>	<i>Opt. 3</i>
Biodiversity (ZOO 450, 452, 454, 456, 458) . . . . .	x	x	x
Cell biology (MICR 350-350L; ZOO 370, 380) . . . . .	x	x	
Ecology/behavior (BIOL 364; ZOO 360, 470) . . . . .	x	x	x
Management (ZOO 472, 474, 475, 476, 477) . . . . .			x
Morphology (ZOO 280, 482) . . . . .	x	x	x
Physiology (ZOO 460, 462, 464) . . . . .	x	x	x

**Zoology Minor**

Requirements for the Zoology minor include BIOL 150/150L, 151/151L, ZOO 315/315L, and electives to total 18 credit hours. Electives must be approved by the chair of the Department of Biological Sciences.

**Department of Chemistry and Molecular Biology**

[www.cbem.ndsu.nodak.edu](http://www.cbem.ndsu.nodak.edu)

Programs leading to the B.S. degree and the B.A. degree are available. For an outline of the general requirements for the B.A. degree, refer to the beginning of the College of Science and Mathematics section.

The principal curricula leading to the B.S. degree are designed to meet the standards set by the Committee on Professional Training of the American Chemical Society (ACS).

Graduate study in chemistry may lead to the Master of Science (M.S.) and to the doctorate (Ph.D.) in

Chemistry. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml)

**Biochemistry and Molecular Biology Major**

Biochemistry and molecular biology involve the interdisciplinary study of the chemical and physical properties of living matter and the chemical changes that take place during life processes. Careers in biochemistry and molecular biology require preparation in chemistry and biology as well as biochemistry and molecular biology. The recent unraveling of the genetic code for humans, some plants, and many microorganisms offers enormous potential in the fields of medicine, agriculture, industry, and molecular forensics, and has opened new areas of research including bioinformatics and proteomics.

To address the requirements of interested students, the Department of Chemistry and Molecular Biology has several biochemical options including the chemistry major with the biochemistry option and a B.S. degree in biochemistry and molecular biology. The latter major offers flexibility to students by including five areas of specialization: biochemistry, molecular biology, biophysics, bioinformatics, and biochemical business.

Depending on the specific option taken, students will have career opportunities in medical, pharmaceutical, food processing, agricultural laboratories, especially in the areas of molecular biology, biotechnology, bioinformatics, and proteomics. Graduates also will have excellent preparation for graduate school or schools of medicine, dentistry, veterinary science, and business.

Graduate work in biochemistry is offered at both the M.S. and Ph.D. levels. Students beginning study in these programs should have a strong chemical background. Prior training in the life sciences is desirable but not essential. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

**Recommended '06-07 Curriculum B.S. in Biochemistry and Molecular Biology Major**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>First Year (All Options)</b>		
BIOL 150, 151, General Biology I, II . . . . .	3	3
BIOL 150L, 151L, General Biology Labs . . . . .	1	1
CHEM 150, 151, Prin of Chemistry I, II <b>or</b> . . . . .	3	3
CHEM 121, 122, Gen Chemistry I, II . . . . .	3	3
CHEM 160, 161, Prin of Chemistry Labs <b>or</b> . . . . .	1	1
CHEM 121L, 122L, Gen Chemistry Labs . . . . .	1	1
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 165, 166, Calculus I, II . . . . .	4	4
UNIV 189, Skills for Academic Success . . . . .	1	--
Totals . . . . .	16	15

**Recommended Curriculum Biochemistry Option**

<b>Second Year</b>		
COMM 110, Fund of Public Speaking . . . . .	--	3
CHEM 341, 342, Organic Chemistry I, II . . . . .	3	3
CHEM 341L, 342L, Organic Chemistry Labs . . . . .	1	1
ZOO 315, Genetics . . . . .	3	--
PHYS 251, 252, Univ Physics I, II . . . . .	4	4
PHYS 251L, 252L, Univ Physics Labs . . . . .	1	1
Behavioral, Soc Sci, Humanities . . . . .	3	3
Totals . . . . .	15	15

<b>Third Year</b>		
BIOC 460, 461, Biochem/Mol Biology . . . . .	4	4
CHEM 431, 431L, Anal Chemistry I, Lab . . . . .	3,2	--
BIOC 491 Seminar . . . . .	--	1
MICR 350, 350L General Microbiology . . . . .	3,1	--
BIOC 474, Meth Recomb DNA Tech . . . . .	--	3

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
BIOC 475, Computer Applic in BMB . . . . .	--	3
Behavioral, Soc Sci, Humanities . . . . .	3	3
Wellness . . . . .	--	2
Totals . . . . .	16	16

<b>Fourth Year</b>		
BIOC 473, Meth Biochem Research . . . . .	4	--
BIOC 465, Phys, Chem, Biophysics . . . . .	4	--
BIOC 485, Industr Biotech . . . . .	--	3
BIOC 483, Cell Sig Transd Metabl . . . . .	3	--
BIOC 494, Research . . . . .	2	2
BIOC 491, Senior Seminar: Modern Concepts in BMB . . . . .	--	2
BMB Area of Specialization . . . . .	3	3
Behavioral, Soc Sci, Humanities . . . . .	--	6
Totals . . . . .	16	16

**Curriculum Total . . . . . 125**

**Additional required courses:**

Plus six credits in other upper division science courses.

**Recommended '06-07 Curriculum Molecular Biology Option**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Second Year</b>		
COMM 110, Fund of Public Speaking . . . . .	--	3
CHEM 341, 342, Organic Chemistry I, II . . . . .	3	3
CHEM 341L, 342L, Organic Chemistry Labs . . . . .	1	1
ZOO 315, Genetics . . . . .	3	--
PHYS 251, 252, Univ Physics I, II <b>or</b> . . . . .	4	4
PHYS 211, 212, Col Physics I, II . . . . .	3	3
PHYS 251L, 252L, Univ Physics Labs <b>or</b> . . . . .	1	1
PHYS 211L, 212L, Col Physics Labs . . . . .	1	1
Behavioral, Soc Sci, Humanities . . . . .	3	3
Totals . . . . .	16	15

<b>Third Year</b>		
BIOC 460, 461, Biochem/Mol Biology . . . . .	4	4
CHEM 431, 431L, Analyt Chemistry I, Lab . . . . .	3,2	--
BIOC 491, Seminar . . . . .	--	1
MICR 350, 350L Gen Microbiology . . . . .	3,1	--
BIOC 474, Meth Recomb DNA Tech . . . . .	--	3
BIOC 475, Computer Applic in BMB . . . . .	--	3
Behavioral, Soc Sci, Humanities . . . . .	3	3
Wellness . . . . .	--	2
Totals . . . . .	16	16

<b>Fourth Year</b>		
BIOC 473, Meth Biochem Research . . . . .	4	--
BIOC 465, Phys, Chem, Biophysics . . . . .	4	--
BIOC 487, Molec Biology Gene Express . . . . .	3	--
BIOC 483, Cell Sig Transd Metabl . . . . .	3	--
BIOC 494, Research . . . . .	2	2
BIOC 491, Senior Seminar: Modern Concepts in BMB . . . . .	--	2
BMB Area of Specialization . . . . .	--	6
Behavioral, Soc Sci, Humanities . . . . .	--	6
Totals . . . . .	16	16

**Curriculum Total . . . . . 123-126**

**Additional required courses:**

Plus six credits in other upper division science courses.

Recommended courses include: MICR 445, Animal and Cell Culture Techniques, 2 cr.; ZOO 370, Cell Biology, 3 cr.; and ZOO 482, Developmental Biology, 3 cr.

**Recommended '06-07 Curriculum Bioinformatics Option**

	<i>Credits</i>	
	<i>F</i>	<i>S</i>
<b>Second Year</b>		
CHEM 341, 342, Organic Chemistry I, II . . . . .	3	3
CHEM 341L, 342L, Organic Chemistry Labs . . . . .	1	1
COMM 110, Fund of Public Speaking . . . . .	--	3
CSCI 160, 161, Computer Sci I, II . . . . .	4	4

	<b>Credits</b>	
	<b>F</b>	<b>S</b>
ZOO 315, Genetics	3	--
PHYS 251, 252, Univ Physics I, II	4	4
PHYS 251L, 252L, Univ Phys Labs	1	1
Behavioral, Soc Sci, Humanities.	3	3
Totals	19	19

**Third Year**

BIOC 460, 461, Biochem/Mol Biology	4	4
CHEM 431, 431L, Analyt Chemistry I, Lab	3,2	--
BIOC 491, Seminar	--	1
MICR 350, 350L, Gen Microbiology	3,1	--
BIOC 474, Meth Recomb DNA Tech	--	3
BIOC 475, Computer Applic in BMB	--	3
CSCI 372, Comparative Languages	3	--
Behavioral, Soc Sci, Humanities	--	3
Wellness	--	2
Totals	16	16

**Fourth Year**

BIOC 473, Meth Biochem Research	4	--
BIOC 465, Phys. Chem, Biophysics	4	--
BIOC 485, Industr Biotech	--	3
BIOC 494, Research	2	2
BIOC 491, Senior Seminar:		
Modern Concepts in BMB	1	1
BMB area of specialization	3	--
Behavioral, Soc Sci, Humanities	3	6
Totals	17	15

**Curriculum Total** ..... 133**Additional required courses:**

Plus nine credits in other upper division computer science courses:

**Recommended courses include:** CSCI 212, Self-Paced C++, 1 cr.; CSCI 315, Syst Anal & Design, 3 cr.; CSCI 373, Assembly Prog., 3 cr.; CSCI 374, Comp. Org. & Arch., 3 cr.; and CSCI 458, Microcomp. Graphics, 3 cr.

**Recommended '06-07 Curriculum Biophysics Option**

	<b>Credits</b>	
	<b>F</b>	<b>S</b>
<b>Second Year</b>		
CHEM 341, 342, Organic Chemistry I, II	3	3
CHEM 341L, 342L, Organic Chemistry Labs	1	1
COMM 110, Fund of Public Speaking	--	3
MATH 128, Intro to Linear Algebra	--	1
MATH 265, Calculus III	--	4
MATH 266, Differential Equat	--	3
ZOO 315, Genetics	--	3
PHYS 251, 252, Univ Physics I, II	4	4
PHYS 251L, 252L, Univ Physics Labs	1	1
Behavioral, Soc Sci, Humanities	3	3
Totals	19	19

**Third Year**

BIOC 460, 461, Biochem/Mol Biology	4	4
CHEM 431, 431L, Analyt Chemistry I, Lab	3,2	--
BIOC 491, Seminar	--	1
MICR 350, 350L, Gen Microbiology	3,1	--
BIOC 474, Meth Recomb DNA Tech	--	3
BIOC 475, Computer Applic in BMB	--	3
Behavioral, Soc Sci, Humanities	3	3
Wellness	--	2
Totals	16	16

**Fourth Year**

BIOC 473, Meth Biochem Research	4	--
CHEM 364, 365, Phys Chemistry I, II	4	4
BIOC 494, Research	2	2
BIOC 491, Senior Seminar:		
Modern Concepts in BMB	1	1
BMB Area of Specialization	6	6
Behavioral, Soc Sci, Humanities	--	6
Totals	17	19

**Curriculum Total** ..... 137**Additional required courses:**

Plus six credits in other upper division computer science courses.

**Recommended courses include:** CSCI 160, Computer Science I, 4 cr.; CSCI 161, Computer Science II, 4 cr.; PPTH 453, Microscopy, 3 cr.; PHYS 350, Intro to Modern Physics, 3 cr.; PHYS 485, Modern Physics I, 3 cr.; CHEM 427, X-Ray Diffraction, 3 cr.; and CHEM 432, Analytical Chem. II, 3 cr.

**Recommended '06-07 Curriculum Biochemical Business Option**

	<b>Credits</b>	
	<b>F</b>	<b>S</b>
<b>Second Year</b>		
COMM 110, Fund of Public Speaking	--	3
CHEM 341, 342, Organic Chemistry I, II	3	3
CHEM 341L, 342L, Organic Chemistry Labs	1	1
ZOO 315, Genetics	--	3
PHYS 251, 252, Univ Physics I, II <b>or</b>	4	--
PHYS 211, 212, Col Phys I, II	3	3
PHYS 251L, 252L, Univ Phys Labs <b>or</b>	1	1
PHYS 211L, 212L, Col Phys Labs	1	1
ECON 201, Prin of Microecon	3	--
ECON 202, Prin of Macroecon	--	3
Totals	15	15

**Third Year**

BIOC 460, 461, Biochem/Mol Biology	4	4
CHEM 431, 431L, Analyt Chemistry I, Lab	3,2	--
BIOC 491 Seminar	--	1
MICR 350, 350L Gen Microbiology	3,1	--
BIOC 474, Meth Recomb DNA Tech	--	3
BIOC 475, Computer Applic in BMB	--	3
PSYC 111, Intro to Psychology	3	--
Behavioral, Soc Sci, Humanities	--	3
Wellness	--	2
Totals	16	16

**Fourth Year**

BIOC 473, Meth Biochem Research	4	--
BIOC 465, Phys. Chem, Biophysics	4	--
BIOC 485, Industrial Biotech	--	3
BIOC 494, Research	2	2
BIOC 491, Senior Seminar:		
Modern Concepts in BMB	1	1
BMB Area of Specialization	6	6
Behavioral, Soc Sci, Humanities	--	6
Totals	17	15

**Curriculum Total** ..... 123-125**Additional required courses:**

Plus nine credits in the upper division business courses.

**Recommended courses include:** BUSN 310, International Business, 3 cr.; BUSN 350, Foundations of Management, 3 cr.; BUSN 360, Foundations of Marketing, 3 cr.; BUSN 464, International Marketing, 3 cr.; BUSN 499, Special Topics: Entrepreneurship/ Small Business Management, 3 cr.; and MIS 370, Management Information Systems, 3 cr.

**Biochemistry Minor**

A minor in Biochemistry also is available. Contact the department for details.

**Chemistry Major**

The ACS certified Chemistry major is the basic degree program designed for students seeking careers in the chemical industry or careers in law, government, journalism, business, etc., that would benefit from a strong background in the physical sciences and mathematics. Many B.S. graduates pursue M.S. or Ph.D. studies.

Students may apply for scholarships available from the Department of Chemistry and Molecular Biology and the Department of Coatings and Polymeric Materials. See [www.ndsu.edu/finaid/scholarship.html](http://www.ndsu.edu/finaid/scholarship.html).

Graduates of the standard Chemistry program for the B.S. degree are certified by the American Chemical Society. The curriculum for the Coatings and Polymeric Materials option includes added specialized courses to the standard program. The curriculum for the Biochemistry option includes biological sciences courses and substitutions of some upper-division chemistry courses for advanced biochemistry courses. These two options also lead to ACS certification of graduates.

**Recommended '06-07 Curriculum Chemistry Major, ACS Certified**

	<b>Credits</b>	
	<b>F</b>	<b>S</b>
<b>First Year</b>		
CHEM 150, 151, Prin of Chemistry I, II	3	3
CHEM 160, 161, Prin of Chemistry Labs	1	1
COMM 110, Fund of Public Speaking	--	3
ENGL 110, 120, College Composition I, II	3	3
MATH 165, 166, Calculus I, II	4	4
UNIV 189, Skills for Academic Success	1	--
General Education <sup>1</sup>	--	3
Wellness	--	2
Totals	15	16

**Second Year**

CHEM 341, 342, Organic Chemistry I, II	3	3
CHEM 353, 354, Maj Org Chemistry Labs	1	2
MATH 128, Intro Linear Algebra	1	--
MATH 259, Multivariate Calculus <sup>2</sup>	--	3
MATH 266, Intro Diff Equations	--	3
PHYS 251, 252, Univ Physics I, II	4	4
PHYS 251L, 252L, Univ Physics Labs	1	1
General Education <sup>1</sup>	--	3
Totals	13	16

**Third Year**

CHEM 431, 431L, Analyt Chemistry I, Lab	3,2	--
CHEM 364, 365, Phys Chemistry I, II	4	4
CHEM 380, Chemistry Junior Seminar	--	1
CHEM 471, Physical Chemistry Lab	--	2
General Education <sup>1</sup>	6	9
Totals	15	16

**Fourth Year**

BIOC 460, Found/Biochem/Molec Biology	4	--
CHEM 425, 429, Inorganic Chemistry, Lab	3,2	--
CHEM 432, 432L, Analyt Chemistry II, Lab	--	3,1
CHEM 491, Seminar in Chemistry	--	2
General Education <sup>1</sup>	6	9
Totals	15	15

**Curriculum Total** ..... 122

<sup>1</sup> General education credits must be selected from approved courses and include 18 credits in humanities and social sciences; six of these must be in humanities and fine arts and six in social/behavioral sciences. Also, three credits must be from the global perspectives category and three from cultural diversity.

<sup>2</sup> MATH 265 may be substituted for MATH 259.

**Recommended '06-07 Curriculum Biochemistry Option, ACS Certified**

	<b>Credits</b>	
	<b>F</b>	<b>S</b>
<b>First Year</b>		
BIOL 150, 150L, General Biology I, Lab	3,1	--
BIOL 151, 151L, General Biology II, Lab	--	3,1
CHEM 150, 151, Prin of Chemistry I, II	3	3
CHEM 160, 161, Prin Lab I, II	1	1
COMM 110, Fund of Public Speaking	--	3
ENGL 110, 120, College Composition I, II	3	3
MATH 165, 166, Calculus I, II	4	4
UNIV 189, Skills for Academic Success	1	--
Totals	16	18

	Credits	
	F	S
<b>Second Year</b>		
CHEM 341, 342, Org Chemistry I, II . . . . .	3	3
CHEM 353, 354, Org Chemistry, Lab . . . . .	1	2
MATH 128, Intro Linear Algebra . . . . .	1	--
MATH 259, Univ Calculus III . . . . .	3	--
MATH 266, Intro Diff Eqns . . . . .	--	3
PHYS 251, 252, Univ Physics I, II . . . . .	4	4
PHYS 251L, 251L, Univ Physics Lab I, II . . . . .	1	1
General Education I . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	15	16

<b>Third Year</b>		
BIOC 460, 461, Biochem/Mol Biology I, II . . . . .	4	4
CHEM 431, 431L, Analytical Chemistry I, Lab . . . . .	3,2	--
CHEM 380, Seminar . . . . .	--	1
CHEM 364, 365, Phys Chemistry I, II . . . . .	4	4
CHEM 491, Phys Chemistry Lab . . . . .	--	2
MICR 350, 350L, Gen Micro, Lab . . . . .	3,1	--
General Education <sup>1</sup> . . . . .	--	6
Totals . . . . .	17	17

<b>Fourth Year</b>		
BIOC 473, Meth Biochem Res . . . . .	3	--
BIOC 474, Meth Recomb DNA Tech . . . . .	--	3
CHEM 425, 429, Inorganic Chemistry, Lab . . . . .	3,2	--
CHEM 491, Senior Seminar . . . . .	--	2
Biological Sci. Electives <sup>2</sup> . . . . .	3	3
General Education <sup>1</sup> . . . . .	3	6
Totals . . . . .	14	14

**Curriculum Total . . . . . 127**

<sup>1</sup> General Education credits must be selected from approved courses and include 18 credits in humanities and social sciences; six of these must be in humanities and fine arts and six in social/behavioral sciences. Also, three credits must be from the global perspectives category and three from cultural diversity.

<sup>2</sup> Biological Science electives include: BIOL 315/315L, BIOL 364, BOT 380, ZOO 370 and MICR 352

## Recommended '06-07 Curriculum Coatings and Polymeric Materials Option

This program is for students who wish to prepare for a career as a chemist in coatings and polymeric materials industries or for graduate school in polymer chemistry. This is the only program in the U.S. that combines an ACS-accredited program in chemistry with a coatings and polymeric materials curriculum. Students have numerous opportunities to participate in the summer research programs and cooperative programs sponsored by industry. For students who elect the Coatings and Polymeric Materials option to the Chemistry major, substantial scholarship support is available.

	Credits	
	F	S
<b>First Year</b>		
CHEM 150, 151, Prin of Chemistry I, II . . . . .	3	3
CHEM 160, 161, Prin of Chemistry I, II Labs . . . . .	1	1
COMM 110, Fund of Public Speaking . . . . .	--	3
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 165, 166, Calculus I, II . . . . .	4	4
UNIV 189, Skills for Academic Success . . . . .	1	--
General Education <sup>1</sup> . . . . .	3	--
Wellness . . . . .	--	2
Totals . . . . .	15	16

<b>Second Year</b>		
CHEM 341, 342, Organic Chemistry I, II . . . . .	3	3
CHEM 353, 354, Majors' Org Chem I, II Labs . . . . .	1	2
MATH 128, Intro to Linear Algebra . . . . .	1	--
MATH 259, Univ Calculus III . . . . .	3	--
MATH 266, Intro/Diff Equations . . . . .	--	3
PHYS 251, 252, Univ Physics I, II . . . . .	4	4
PHYS 251L, 252L, Univ Physics I, II Labs . . . . .	1	1
General Education <sup>1</sup> . . . . .	--	3
Totals . . . . .	13	16

	Credits	
	F	S
<b>Third Year</b>		
CHEM 364, 365, Physical Chemistry I, II . . . . .	4	4
CHEM 380, Chemistry Junior Seminar . . . . .	--	1
CHEM 431, 431L, Analyt Chemistry I, Lab . . . . .	3,2	--
CHEM 471, Physical Chemistry Lab . . . . .	--	2
CPM 474, 475, Coatings I, II . . . . .	3	3
CPM 484, 485, Coatings I, II Labs . . . . .	2	2
General Education <sup>1</sup> . . . . .	3	3
Totals . . . . .	17	15

<b>Fourth Year</b>		
BIOC 460, Found/Biochem/Molec Biology . . . . .	4	--
CHEM 425, 429, Inorg Chemistry, Lab . . . . .	4,1	--
CHEM 432, 432L, Analyt Chemistry II, Lab . . . . .	--	3,1
CHEM 491, Chemistry Senior Seminar . . . . .	--	2
CPM 473, Polymer Synthesis . . . . .	3	--
General Education <sup>1</sup> . . . . .	3	9
Totals . . . . .	15	15

**Curriculum Total . . . . . 122**

<sup>1</sup> General Education credits must be selected from approved courses and include 18 credits in humanities and social sciences; six of these must be in humanities and fine arts and six in social/behavioral sciences. Also, three credits must be from the global perspectives category and three from cultural diversity.

## Recommended '06-07 Curriculum Pre-Professional Chemistry Option

This option is designed for students interested in medical, dental, optometry, or veterinary professional school, but who wish an alternative career path to careers in industry, law, government, journalism, business, and others, which would benefit from a strong background in the physical sciences and mathematics. This option also provides excellent preparation for graduate study in biochemistry, biotechnology, and molecular biology.

ACS certification may be earned by choosing CHEM 429, 471, and either BIOC 461 or CHEM 432/432L as electives.

	Credits	
	F	S
<b>First Year</b>		
BIOL 150, 150L, General Biology I, Lab . . . . .	3,1	--
BIOL 151, 151L, General Biology II, Lab . . . . .	--	3,1
CHEM 150, 151, Prin of Chemistry I, II . . . . .	3	3
CHEM 160, 161, Prin of Chemistry I, II Labs . . . . .	1	1
ENGL 110, 120, College Composition I, II . . . . .	3	3
COMM 110, Fund of Public Speaking . . . . .	--	3
MATH 165, 166, Calculus I, II . . . . .	4	4
UNIV 189, Skills for Academic Success . . . . .	1	--
Totals . . . . .	16	18

<b>Second Year</b>		
CHEM 341, 342, Org Chemistry I, II . . . . .	3	3
CHEM 353, 354, Majors' Org Chem I, II Labs . . . . .	1	2
MATH 128, Intro to Linear Algebra . . . . .	1	--
MATH 259, 266, Univ Calc III, Intro/Diff Eqns . . . . .	3	3
PHYS 251, 252, Univ Physics I, II . . . . .	4	4
PHYS 251L, 252L, Univ Phys I, II Lab . . . . .	1	1
General Education <sup>1</sup> . . . . .	3	3
Wellness . . . . .	2	--
Totals . . . . .	15	16

<b>Third Year</b>		
CHEM 364, 365, Physical Chemistry I, II . . . . .	4	4
CHEM 380, Chemistry Junior Seminar . . . . .	--	1
CHEM 431, 431L, Analytical Chemistry I, Lab . . . . .	3,2	--
EDUC 321, Intro to Teaching . . . . .	3	--
EDUC 322, Educational Psych . . . . .	--	3
EDUC 381, Early Experience . . . . .	--	1
General Education <sup>1</sup> . . . . .	--	6
Physics Elective . . . . .	3	--
Totals . . . . .	13	14

	Credits	
	F	S
<b>Fourth Year</b>		
CHEM 425, Inorganic Chemistry . . . . .	3	--
BIOC 460, Found/Biochem/Molec Biology I . . . . .	4	--
CHEM 491, Chemistry Senior Seminar . . . . .	--	2
BIOL 220, 221, Human Anat/Phys I/II . . . . .	3	3
BIOL 220L, 221L, Anat/Phys Labs . . . . .	1	1
General Education <sup>1</sup> . . . . .	--	6
Electives . . . . .	3	3
Totals . . . . .	14	15

**Curriculum Total . . . . . 122**

<sup>1</sup> General Education credits must be selected from approved courses and include 18 credits in humanities and social sciences; six of these must be in humanities and fine arts and six in social/behavioral sciences. Also, three credits must be from the global perspectives category and three from cultural diversity.

## Recommended '06-07 Curriculum Chemistry Education Option

This option is designed for the student interested in a disciplinary major in chemistry, but who also is considering becoming a chemistry and physics teacher. The curriculum includes physics course work beyond the usual chemistry major to enable the graduate to teach physics in most states. For teacher certification, students must apply to the School of Education to enroll in the additional requirements, which include EDUC 389, 451, 481, 485, 486, and 487, taken post-baccalaureate.

ACS certification may be earned by taking CHEM 471 and 432/432L, as additional courses and choosing BIOC 460 instead of CHEM 260.

Scholarships starting in the sophomore year are available for students in the Chemical Education option.

	Credits	
	F	S
<b>First Year</b>		
CHEM 150, 151, Prin of Chemistry I, II . . . . .	3	3
CHEM 160, 161, Prin of Chemistry I, II Labs . . . . .	1	1
COMM 110, Fund of Public Speaking . . . . .	--	3
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 165, 166, Calculus I, II . . . . .	4	4
BIOL 150, 150L, General Biology I/Lab . . . . .	3,1	--
UNIV 189, Skills for Academic Success . . . . .	1	--
General Education <sup>1</sup> . . . . .	--	3
Totals . . . . .	16	17

<b>Second Year</b>		
CHEM 341, 342, Organic Chemistry I, II . . . . .	3	3
CHEM 353, 354, Majors' Org Chem I, II Labs . . . . .	1	2
MATH 128, Intro to Linear Algebra . . . . .	1	--
MATH 259, 266, Univ Calc III, Intro/Diff Eqns . . . . .	3	3
PHYS 251, 252, Univ Physics I, II . . . . .	4	4
PHYS 251L, 252L, Univ Physics I, II Labs . . . . .	1	1
General Education <sup>1</sup> . . . . .	--	3
Wellness . . . . .	2	--
Totals . . . . .	15	16

<b>Third Year</b>		
CHEM 364, 365, Physical Chemistry I, II . . . . .	4	4
CHEM 380, Chemistry Junior Seminar . . . . .	--	1
CHEM 431, 431L, Analytical Chemistry I, Lab . . . . .	3,2	--
EDUC 321, Intro to Teaching . . . . .	3	--
EDUC 322, Educational Psych . . . . .	--	3
EDUC 381, Early Experience . . . . .	--	1
General Education <sup>1</sup> . . . . .	--	6
Physics Elective . . . . .	3	--
Totals . . . . .	15	15

	<b>Credits</b>	
	<b>F</b>	<b>S</b>
<b>Fourth Year</b>		
BIOC 460, Found/Biochem/Molec Biology I . . . . .	4	--
CHEM 425, Inorganic Chemistry . . . . .	3	--
CHEM 491, Chemistry Senior Seminar . . . . .	--	2
General Education <sup>1</sup> . . . . .	3	6
Electives <sup>2</sup> . . . . .	4	6
Totals . . . . .	14	14
<b>Curriculum Total . . . . .</b>	<b>122</b>	

<sup>1</sup> General Education credits must be selected from approved courses and include 18 credits in humanities and social sciences; six of these must be in humanities and fine arts and six in social/behavioral sciences. Also, three credits must be from the global perspectives category and three from cultural diversity

<sup>2</sup> A course in earth sciences and in biology may be required for certification in some states. GEOL 105/105L and BIOL 151/151L are recommended electives.

To meet requirements of the "No Child Left Behind" Act of 2001, students interested in Chemistry Education are encouraged to declare a double major in their discipline and in education (i.e., chemistry education and chemistry). Such double majors may typically be earned by successful completion of a few additional credits. Students should contact their advisors or the Office of Registration and Records for details and are encouraged to declare their primary and secondary majors with the Office of Registration and Records, Ceres 110.

### Chemistry Minor

Requirements for a Chemistry minor are CHEM 121, 121L, 122, 122L, plus 11 credits in chemistry, biochemistry, or coatings and polymeric materials at the 300-course level or higher, including at least one laboratory credit.

## Department of Coatings and Polymeric Materials

<http://cpm.ndsu.nodak.edu>

The Department of Coatings and Polymeric Materials is internationally known for the excellence of its educational and research programs. Close ties with industry and government agencies are maintained to assure that teaching and research programs remain in step with the rapidly changing science and technology of the area.

Knowledge of polymers is a desirable foundation for a career as a professional chemist in industry. More than 80 percent of the industrial chemists work with polymers, and many physicists and engineers also work on polymer-related projects.

Within the broad area of polymers, the department puts special emphasis on coatings. Coatings are encountered so often in everyday life they may be taken for granted. Paint on walls, coatings on automobiles or aircraft, liners for the interior of beverage cans, coatings to protect bridges from corrosion, coatings on magnetic tapes and computer chips, and body implants are only a few selected examples.

Closely related fields are adhesives, printing inks, plastics, cosmetics, food, and biotechnology. Since only five other universities in the U.S. offer programs in coatings, employment opportunities far exceed the number of graduates.

To encourage students to study in the field, companies and organizations fund undergraduate scholarships of up to \$2,500 a year. Entering freshmen and transfer students apply for these scholarships through the Office of Admission. Undergraduates already enrolled at NDSU apply to the department chair.

While a minor is available, the Department of Coatings and Polymeric Materials does not offer an undergraduate major. Undergraduates interested in polymers and coatings are encouraged to major in Chemistry or Mechanical Engineering (ME).

Coatings and Polymeric Materials offers graduate level programs leading to the M.S. and Ph.D. degrees in Coatings and Polymeric Materials.

### Coatings and Polymeric Materials Minor

The Coatings and Polymeric Materials minor provides excellent preparation for professional employment at the B.S. level and for graduate school. Students are strongly advised to plan their programs so that the entire coatings course (CPM 474, 475) and laboratory sequence (CPM 484, 485 for Chemistry majors) (CPM 484 for ME majors) can be taken during the same academic year. Chemistry majors with the CPM minor also are required to take polymer synthesis (CPM 473) prior to graduation.

## Department of Computer Science

[www.cs.ndsu.nodak.edu](http://www.cs.ndsu.nodak.edu)

### Computer Science Major

The Department of Computer Science at NDSU offers degrees in the following areas: Bachelor of Arts: Computer Science; Bachelor of Science: Computer Science or double major in Computer Science and Mathematics; Master of Science: Computer Science or Software Engineering; Ph.D.: Computer Science or Software Engineering; Graduate Certificate: Digital Enterprise (e-commerce) or Software Engineering.

The B.S. program is accredited by the Computing Accreditation Commission of ABET. Minors in computer science and computer science education also are offered. Advisors will provide students with personal attention in formulating programs with personal attention tailored to the interests and abilities of the individual student. For students with no computer experience, introductory courses are offered in the standard curriculum for majors. It is possible for advanced undergraduate students to take graduate courses while completing the undergraduate program.

Graduates in computer science might choose a job in technology development, business, agriculture, industry, education, research, or government. Their work might be in any of these areas: systems analysis, security, information assurance, bioinformatics, Web development, networking, information system development, data base management, software systems, computer operating systems, systems for process control, automation systems, simulation models, design and development of new computer systems, or management.

Graduates of the computer science program have recently accepted employment in major national businesses and industries. Many have chosen positions in North Dakota and adjoining states. With the wide use of computers and the Internet there is a growing need for computer specialists within North Dakota. Graduates are typically offered attractive starting salaries. Placement rates are high, and job prospects are projected to grow dramatically in upcoming years.

To be prepared to enter the Computer Science program, a student should have the usual college preparatory courses including at least three years of mathematics.

Courses that develop the ability to think logically, to organize, and to analyze are especially important and require a background in mathematics (e.g., algebra, geometry, trigonometry). Experience with a computer is not necessary.

Students who have taken college-level courses or who have computer experience in can have their work evaluated for possible advanced placement.

The computer science undergraduate programs, based on recommendations of the Association for Computing Machinery, consist of a core of courses required for majors and a large selection of service courses and advanced courses. Courses in the B.S. program are normally taught by regular faculty. In the core, students are offered an opportunity to study concepts, applications, and implementation techniques that provide a broad and practical base for both further study and a career in computing. Through a variety of service courses, every student in the university is provided an opportunity to develop computer literacy or competency. Through advanced undergraduate and graduate courses, students are offered an opportunity for in-depth study of such topics as artificial intelligence, programming languages, system simulation, computer networks, security, information assurance, office automation, bioinformatics, software development, combinatorial optimization, systems programming, data mining, and data base management systems. Students are encouraged to choose elective courses from related areas including business, economics, engineering, mathematics, operations research, and statistics.

After completing part of their studies, students will find many opportunities to work part time as a research assistant to a scientist on campus, or as an intern with a local business, applying what they have learned in the classroom. Co-op opportunities starting in the junior year are available.

### Recommended '06-07 Curriculum Computer Science Major

	<b>Credits</b>	
	<b>F</b>	<b>S</b>
<b>First Year</b>		
CSCI 160, 161, Comp Sci I, II . . . . .	4	4
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 165, 166, Calculus I, II . . . . .	4	4
UNIV 189, Skills for Academic Success . . . . .	1	--
Humanities, Soc Sci Electives . . . . .	6	6
Totals . . . . .	18	17

#### Second Year

COMM 110, Fund of Public Speaking . . . . .	--	3
CSCI 222, Discrete Math . . . . .	3	--
CSCI 235, 236, Theory Comp Sci I, II . . . . .	3	3
CSCI 373, 374, Assembl Prog, Comp Org . . . . .	3	3
STAT 367, 368, Probability Stats . . . . .	3	3
Lab Science . . . . .	3,1	3,1
Wellness . . . . .	2	--
Totals . . . . .	18	16

#### Third Year

CSCI 366, 372, File/Data Sys, Comp Lang . . . . .	3	3
CSCI 467, Algorithm Analysis . . . . .	--	3
Comp Sci Elective . . . . .	3	--
Humanities/Soc Sci Elective . . . . .	3	--
Science Electives . . . . .	3	3
Free Electives . . . . .	3	6
Totals . . . . .	15	15

	Credits	
	F	S
<b>Fourth Year</b>		
CSCI 445, Software Project	--	3
CSCI 474, Op Systems	3	--
CSCI 475, Op Systems II <b>or</b>		
CSCI 468, Database Mgmt	--	3
CSCI 489, Soc Implications	--	3
Comp Sci Electives	3	3
Free Electives	9	6
Totals	15	18
<b>Curriculum Total</b>	<b>122</b>	

Choose electives that satisfy the general requirements for the B.S. or B.A. degree, as appropriate, including the general education requirements. There must be a total of 18 credits in computer science courses numbered 300 or higher approved for the major by your advisor. See the document "Requirements for a Bachelor's degree in Computer Science at NDSU" for distribution requirements that must be satisfied in choosing electives. This document is available from the department office, 258 IACC, or on the Web ([www.cs.ndsu.nodak.edu](http://www.cs.ndsu.nodak.edu)).

### Computer Science Minor

A minor in Computer Science requires at least 18 semester hours of select computer science courses. A grade of C or better is required in all courses applied toward the computer science minor. Contact the department for details

## Department of Geosciences

[www.ndsu.edu/geosci](http://www.ndsu.edu/geosci)

Geology and Geography are the sciences of the Earth, its environments, peoples, and cultures.

### Geology Major

Geology is one of the most exciting and rewarding areas of study. Understanding Earth's environment is accomplished through an interdisciplinary curriculum where knowledge of physics, chemistry, mathematics, biology, engineering and soil science come together to offer a better understanding of our Earth.

Opportunities for a career in geology have never been better. Areas of environmental science, petroleum, mining, water and land resources, volcanology, paleontology, and glacial geology offer rewarding careers with a completed bachelor's degree. Many students continue study at the graduate level.

Curriculum requirements include a departmental core of 47 credits, including year-long sequences in calculus, chemistry, and physics, as well as skills courses in technical writing and computer science.

A typical first year for all geology majors includes physical geology, the Earth through time, and year-long sequences in English, mathematics, and chemistry.

**Teaching Option:** Curriculum emphasis is on the teaching of earth science. Students preparing for teaching earth science in the secondary schools must follow the School of Education curriculum.

Students interested in Earth Science Education are encouraged to declare a double major in their discipline and in education (i.e., earth science and geology). Such double majors may typically be earned by successful completion of a few additional credits. Students should contact their advisors or the Office of Registration and Records for details, and are encouraged to declare their primary and secondary majors with the Office of Registration and Records, 110 Ceres.

## Recommended '06-07 Curriculum Geology Core Requirements<sup>1</sup> Geosciences and Soil Science Courses<sup>2</sup>

	Credits
GEOL 105, 105L, Phys Geology, Lab	4
GEOL 106, 106L, Earth Through Time, Lab	4
GEOL 457, Structural Geology	4
GEOL 440, Quaternary Biology	4
GEOL 410, Sedimentology/Stratigraphy	4
GEOG 412, Geomorphology	3
GEOL 420, 421, Mineralogy, Lab	6
GEOL 422, 423, Petrology/Petrography	6
GEOL 450, Field Geology <sup>3</sup>	3
GEOG 455, Intro Geographic Info Systems	3
GEOL 491, Seminar	2
SOIL 444, Soil Genesis & Survey	4
Total	47

### Chemistry Courses

CHEM 121, 121L, General Chemistry I, Lab <b>or</b>	
CHEM 150, 160, Prin Chemistry, Lab <sup>4</sup>	4
CHEM 122, 122L, General Chemistry II, Lab <b>or</b>	
CHEM 151, 161, Prin Chemistry, Lab	4
Total	8

### Mathematics Courses

MATH 103, 105, College Algebra, Trig <sup>5</sup>	6
MATH 146, 147, Applied Calculus I, II <b>or</b>	
MATH 165, 166, Calculus I, II	8
Total	8-14

### Physics Courses

PHYS 211, 211L, College Physics I, Lab <b>or</b>	
PHYS 251, 251L, Univ Physics I, Lab <sup>7</sup>	4-5
PHYS 212, 212L, College Physics II, Lab <b>or</b>	
PHYS 252, 252L, Univ Physics II, Lab	4-5
Total	8-10

### Skills Courses

CSCI 122 or 126, BASIC or FORTRAN	3
ENGL 324, Writing in the Sciences	3
Total	6

**Total Core Requirements**..... 77-85

<sup>1</sup> The departmental requirements for graduation are those in existence at the beginning of the junior year of the major. In addition, all university requirements must be met.

<sup>2</sup> The following courses are strongly recommended: SOIL 210, 217, GEOL 300, 301, 302, 303, 304, 413, 414, 428, and GEOG 161, 455, 456.

<sup>3</sup> A fee will be charged to offset travel costs associated with GEOL 301, 302, 303, 304, 450, and 496.

<sup>4</sup> This sequence is recommended only for those with high school chemistry; a minimum math ACT score in the 60th percentile, and the intention of taking more chemistry.

<sup>5</sup> Some may have had adequate mathematics preparation in high school. For those who have not, MATH 103 (College Algebra) and MATH 105 (Trigonometry) are recommended.

<sup>6</sup> Majors planning to enter graduate school should note that Applied Calculus (MATH 146 and 147) is not considered adequate preparation in calculus by some programs.

<sup>7</sup> Calculus-based physics is recommended for all students planning to pursue advanced degrees and is required for the geochemistry option.

**NOTE:** Majors planning on graduate studies should be aware that a summer field camp course may be required for graduate admission. This course is recommended to be taken during the summer following the junior or senior year. Information on field camp courses and a small departmental scholarship to support these studies may be obtained from an advisor.

## Geography Minor

Emphases in the geography program are: (a) gaining an understanding of the geographic perspective, and (b) acquiring skills in the use of spatial analysis tools (such as geographic information systems (GIS), computer mapping, and other computer applications).

Geography offers a minor that may be taken in conjunction with a variety of majors such as social science and secondary education. Minor requirements are 18 credits selected in consultation with the geography advisor. Students preparing for teaching geography in the secondary schools should follow the School of Education curriculum.

## Geology Minor

A minor in geology consists of at least 18 credits of geology courses selected in consultation with a minor advisor. Selected geography and soil science courses may be substituted for geology courses.

## Department of Mathematics

[www.math.ndsu.nodak.edu](http://www.math.ndsu.nodak.edu)

### Mathematics Major

Mathematics is the language of science and technology. Its explosive development in the 20th century and its history as the oldest and most highly developed discipline make it one of the most exciting and rewarding areas of study.

The use of mathematics and the need for mathematical competence has increased tremendously. Mathematical training is in high demand in such fields as actuarial science, business, economics and commerce, engineering, and statistics, as well as the basic sciences. These disciplines, in turn, feed back new directions to the mathematical community. Trends indicate that students should plan their programs to reflect the increased emphasis on interdisciplinary competency.

Students are able to study theoretical and applied mathematics to prepare for careers or for further schooling while studying with faculty members who have a wide range of interests and expertise. Students may earn academic credit by applying what they have learned in the classroom as they gain on-the-job experience through the Cooperative Education Program. Opportunities also exist for students to work as paper graders and assistants to professors.

The department offers a broad and balanced curriculum of courses. A student may major or minor in mathematics or mathematics education.

Students interested in mathematics education should consult with their major advisor and the School of Education for professional education requirements. To meet requirements of the "No Child Left Behind" Act 2001, students interested in Mathematics Education are encouraged to declare a double major in their discipline and in education (i.e., mathematics education and mathematics). Such double majors may typically be earned by successful completion of a few additional credits. Students should contact their advisors or the Office of Registration and Records for details, and are encouraged to declare their primary and secondary majors with the Office of Registration and Records, Ceres 110.

Special double majors are available with computer science, physics, and statistics. These double majors take advantage of the close relationship between mathematics and other disciplines, and allow students pursuing a major in one of these fields to expand their mathematical background.

While the choice of major need not be made during the freshman year, an early decision allows more

flexibility in tailoring programs to individual interests. The department also has a graduate program offering both an M.S. and a Ph.D. in mathematics.

**Pre-Actuarial Science Option**

Actuarial science is the study of the evaluation and measurement of risk. The Actuary Science Option is a pre-professional program designed to provide the background needed to enter the field. Entrance into the profession is regulated under a system of examinations run by actuarial professional societies. The curriculum of the option is designed to prepare the student to pass several of these examinations. The nature of the actuarial profession requires its practitioners to have a broad knowledge of finance, law, mathematics, management, and statistics. This option leads to a double major in mathematics and statistics with either a minor in economics or additional courses in business. Students selecting this option are requested to visit with the actuarial adviser in the Department of Mathematics early and often to confirm their progress and to inform themselves of changes in the examination curriculum.

**Sample '06-07 Curriculum Mathematics Major**

	Credits	
	F	S
<b>First Year</b>		
COMM 110, Fund of Public Speaking	--	3
CSCI 160, Computer Science I	4	--
ENGL 110, 120, College Composition I, II	3	3
MATH 165, 166, Calculus I, II	4	4
UNIV 189, Skills for Academic Success	--	1
General Electives <sup>1</sup>	3	6
<b>Totals</b>	<b>15</b>	<b>16</b>

<b>Second Year</b>		
MATH 265, Calculus III	4	--
MATH 266, Differential Equations	--	3
MATH 270, Abstract Mathematics <sup>2</sup>	3	--
MATH 429, Linear Algebra	--	3
PHYS 251-L, 252-L, Univ Physics I, II <sup>3</sup>	5	5
Wellness	--	2
General Electives <sup>1</sup>	3	3
<b>Totals</b>	<b>15</b>	<b>16</b>

<b>Third Year</b>		
MATH 420, 421, Abstract Algebra I, II	3	3
MATH or Related Electives <sup>4</sup>	9	9
General Electives <sup>1</sup>	3	3
<b>Totals</b>	<b>15</b>	<b>15</b>

<b>Fourth Year</b>		
MATH 450, 451, Real Analysis I, II	3	3
MATH 491, Senior Seminar	1	--
MATH or Related Electives <sup>4</sup>	9	9
General Electives <sup>1</sup>	3	3
<b>Totals</b>	<b>16</b>	<b>15</b>

**Curriculum Total . . . . . 123**

<sup>1</sup> In choosing electives, a student must satisfy the general education requirements for a B.A. or B.S. degree.

<sup>2</sup> Students need to keep in mind that MATH270, (Introduction to Abstract Mathematics), a prerequisite for all upper level mathematics courses, is offered only once a year in the fall semester:

<sup>3</sup> The PHYS 251-L/252-L laboratory sequence is one of six approved laboratory sequences (including Chemistry and Computer Science) for this major. For more details on other approved laboratory sequences, students should contact the Department of Mathematics.

<sup>4</sup> Mathematics electives may be chosen to emphasize pure, applied, computational, or actuarial interests. At least one approved upper-division one-year sequence must be elected and at least one course must be chosen from each of lists A and B. Special double-major options with computer science, statistics, and physics are available.

A: MATH 374, 430, 436, 440, 445, 446, 452, 472  
 B: MATH 447, 473, 480, 481, 482, 483, 488, 489, STAT 467, CSCI 453

**Sample '06-07 Curriculum Mathematics and Computer Science**

	Credits	
	F	S
<b>First Year</b>		
COMM 110, Fund of Public Speaking	--	3
CSCI 160, 161, Comp Science I, II	4	4
ENGL 110, 120, College Composition I, II	3	3
MATH 165, 166, Calculus I, II	4	4
UNIV 189, Skills for Academic Success	--	1
General Electives <sup>1</sup>	3	3
<b>Totals</b>	<b>15</b>	<b>17</b>

<b>Second Year</b>		
CSCI 235, 236, Theoretical Comp Science I, II	3	3
MATH 265, Calculus III	4	--
MATH 266, Differential Equations	--	3
MATH 270, Abstract Mathematics <sup>2</sup>	3	--
MATH 429, Linear Algebra	--	3
PHYS 251-L, 252-L, Univ Physics I, II <sup>3</sup>	5	5
Wellness	--	2
<b>Totals</b>	<b>15</b>	<b>16</b>

<b>Third Year</b>		
CSCI 373, Assembly Programming	3	--
CSCI 374, Computer Architecture	--	3
CSCI 372, Comparative Languages	3	--
CSCI 467, Algorithm Analysis	--	3
MATH 420, 421, Abstract Algebra I, II	3	3
General Electives <sup>1</sup>	6	6
<b>Totals</b>	<b>15</b>	<b>15</b>

<b>Fourth Year</b>		
CSCI 366, Database Systems	3	--
CSCI 458, Microcomputer Graphics	3	--
CSCI 474, Operating Systems	--	3
CSCI 489, Capstone Course	--	3
MATH 430, Graph Theory	3	--
MATH 436, Combinatorics	--	3
MATH 491, Senior Seminar	1	--
STAT 367, Probability	3	--
STAT 368, Statistics	--	3
General Electives <sup>1</sup>	3	3
<b>Totals</b>	<b>16</b>	<b>15</b>

**Curriculum Total . . . . . 124**

<sup>1</sup> In choosing electives, a student must satisfy the general education requirements for a B.A. or B.S. degree.

<sup>2</sup> Students double majoring in Mathematics and Computer Science can use CSCI 222 to satisfy the MATH 270 prerequisite for all upper level mathematics courses. MATH 270 is offered only once a year in the fall semester.

<sup>3</sup> The PHYS 251-L/252-L laboratory sequence is one of five approved laboratory sequences (including Chemistry, Biology, Microbiology) for this double major. For more details on other approved laboratory sequences, students should contact the Departments of Mathematics or Computer Science.

**Sample '06-07 Curriculum Mathematics and Physics**

	Credits	
	F	S
<b>First Year</b>		
COMM 110, Fund of Public Speaking	--	3
CSCI 160, Comp Science I	4	--
ENGL 110, 120, College Composition I, II	3	3
MATH 165, 166, Calculus I, II	4	4
UNIV 189, Skills for Academic Success	--	1
General Electives <sup>1</sup>	3	3
<b>Totals</b>	<b>15</b>	<b>13</b>

	Credits	
	F	S
<b>Second Year</b>		
MATH 265, Calculus III	4	--
MATH 266, Differential Equations	--	3
MATH 270, Abstract Mathematics <sup>2</sup>	3	--
MATH 429, Linear Algebra	--	3
PHYS 251-L-R, 252-L-R, Univ Physics I, II	6	6
Wellness	--	2
General Electives <sup>1</sup>	3	3
<b>Totals</b>	<b>16</b>	<b>17</b>

<b>Third Year</b>		
MATH 420, 421, Abstract Algebra I, II	3	3
PHYS 350, Modern Physics	3	--
PHYS 351, Mechanics I	3	--
PHYS 361, Electromagnetic Theory	4	--
PHYS 370, Intro to Computational Physics	--	3
PHYS 401, Intro to Condensed Matter Physics	--	3
General Electives <sup>1</sup>	3	6
<b>Totals</b>	<b>16</b>	<b>15</b>

<b>Fourth Year</b>		
MATH 450, 451, Real Analysis I, II	3	3
MATH 488, 489, Numerical Analysis I, II	3	3
MATH 491, Senior Seminar	1	--
PHYS 462, Thermodynamics	3	--
PHYS 471, Advanced Laboratory	--	2
PHYS 485, 486, Quantum Mechanics I, II	3	3
PHYS 489, Capstone Course	--	1
General Electives <sup>1</sup>	3	3
<b>Totals</b>	<b>16</b>	<b>15</b>

**Curriculum Total . . . . . 122**

<sup>1</sup> In choosing electives, a student must satisfy the general education requirements for a B.A. or B.S. degree.

<sup>2</sup> MATH 270 is offered only once a year in the fall semester.

**Sample '06-07 Curriculum Mathematics and Statistics**

	Credits	
	F	S
<b>First Year</b>		
COMM 110, Fund of Public Speaking	--	3
CSCI 160, Comp Science I	4	--
ENGL 110, 120, College Composition I, II	3	3
MATH 165, 166, Calculus I, II	4	4
UNIV 189, Skills for Academic Success	--	1
General Electives <sup>1</sup>	3	6
<b>Totals</b>	<b>15</b>	<b>16</b>

<b>Second Year</b>		
MATH 265, Calculus III	4	--
MATH 266, Differential Equations	--	3
MATH 270, Abstract Mathematics <sup>2</sup>	3	--
MATH 429, Linear Algebra	--	3
PHYS 251-L, 252-L, Univ Physics I, II <sup>3</sup>	5	5
STAT 330, Intro Statistics	--	3
Wellness	--	2
General Electives <sup>1</sup>	3	--
<b>Totals</b>	<b>15</b>	<b>16</b>

<b>Third Year</b>		
MATH 420 Abstract Algebra I	3	--
STAT 461, Regression Models	3	--
STAT 462, Experimental Design	--	3
Statistics Electives <sup>4</sup>	3	3
General Electives <sup>1</sup>	6	9
<b>Totals</b>	<b>15</b>	<b>15</b>

<b>Fourth Year</b>		
MATH 450, 451, Real Analysis I, II	3	3
MATH 491, Senior Seminar	1	--
STAT 467, 468, Mathematical Stats I, II	3	3
STAT 491, Capstone Seminar	--	1
Statistics Electives <sup>4</sup>	3	3
General Electives <sup>1</sup>	6	6
<b>Totals</b>	<b>16</b>	<b>16</b>

**Curriculum Total . . . . . 122**



<sup>1</sup> In choosing electives, a student must satisfy the general education requirements for a B.A. or B.S. degree.

<sup>2</sup> MATH 270 is offered only once a year in the fall semester.

<sup>3</sup> The PHYS 251-L/252-L laboratory sequence is one of six approved laboratory sequences (including Chemistry, Biology, Microbiology, and Computer Science) for this double major. For more details on other approved laboratory sequences, students should contact the Departments of Mathematics or Statistics.

<sup>4</sup> Statistics electives include any 400 level 3 credit Statistics courses other than those listed above.

### Sample '06-07 Curriculum Mathematics and Statistics (Pre-Actuarial Science Option)

	Credits	
	F	S
<b>First Year</b>		
COMM 110, Fund of Public Speaking	--	3
CSCI 160, 161, Comp Science I, II	4	4
ENGL 110, 120, College Composition I, II	3	3
MATH 165, 166, Calculus I, II	4	4
STAT 330, Intro to Statistics	--	3
UNIV 189, Skills for Academic Success	1	--
<b>Totals</b>	15	14

<b>Second Year</b>		
ACCT 200, 201, Elements Acct I, II	3	3
ECON 201, 202, Prin Micro, Macro	3	3
MATH 265, Calculus III	4	--
MATH 266, Intro to Diff Equations	3	3
MATH 270, Intro to Abstract Math	3	--
MATH 429, Linear Algebra	--	3
STAT 400-level Elective	3	--
STAT 462, Intro/Experimental Design	3	3
<b>Totals</b>	16	15

<b>Third Year</b>		
STAT 400-level Electives <sup>2</sup>	3	6
MATH 450, Real Analysis I	3	--
Science Option <sup>4</sup>	6	4
STAT 467, 468, Prob/Math Stat I, II	3	3
Humanities & Fine Arts <sup>1</sup>	3	3
Electives	3	3
<b>Totals</b>	18	16

<b>Fourth Year</b>		
MATH 376, Actuarial Exam/Capstone	1	--
MATH 451, Real Analysis II <b>or</b>	--	3
MATH 489, Numerical Analysis II	--	3
MATH 488, Numerical Analysis I	3	--
STAT 476, Actuary Exam II/Capstone	1	--
Busn, Econ or CSCI Electives <sup>3</sup>	3	6
Social/Behavioral Science Electives <sup>1</sup>	3	3
STAT 461, Applied Regression Models	3	--
Statistics 400-Level Electives <sup>2</sup>	3	3
Wellness	2	--
<b>Totals</b>	15	16

**Curriculum Total** ..... 125

<sup>1</sup> In choosing electives, a student must satisfy the general education requirements for a B.A. or B.S. degree.

<sup>2</sup> MATH 270 is offered only once a year in the fall semester.

<sup>3</sup> The PHYS 251-L/252-L laboratory sequence is one of five approved laboratory sequences (including Chemistry, Computer Science, and Biology) for this major. For more details on other approved laboratory sequences, students should contact the Departments of Mathematics or Statistics.

<sup>4</sup> Statistics electives include any 400 level 3 credit Statistics courses other than those listed above.

<sup>5</sup> Computer Science, Business and Economics electives include BUSN 340, 441, 442, 444, CSCI 453, 454, ECON 341, 343, or any other 400 level Economics course.

### Math and Math Education Minors

A minor in Math or Math Education requires 21 credits in select math courses. A grade of C or better is required in these courses. Contact the department for details.

### Department of Physics

[www.physics.ndsu.nodak.edu/](http://www.physics.ndsu.nodak.edu/)

### Physics Major

Students who complete a major in Physics are prepared for careers in industrial and governmental research and development; for graduate study in physics, astronomy, engineering, medicine, oceanography, materials science; and for environmental science. In-depth preparation also is provided for teaching in secondary schools.

To meet requirements of the "No Child Left Behind" Act 2001, students interested in Physics Education are encouraged to declare a double major in their discipline and in education (i.e., physics education and physics). Such double majors may typically be earned by successful completion of a few additional credits. Students should contact their advisors or the Office of Registration and Records for details and are encouraged to declare their primary and secondary majors with the Office of Registration and Records, Ceres 110.

The Physics program requirements include a minimum of 40 credits in physics; 22 credits in mathematics; 30 in the languages, social sciences, and the humanities; and six credits of chemistry. Students are required to take PHYS 251, 251L, 251R, 252, 252L, 252R, 330 (MSUM), 350, 361, 401, 411, 462, 471 and 485, plus at least two courses selected from PHYS 352, 370, 413, 415, 463, 486 or Minnesota State University Moorhead (MSUM) PHYS 360, 380 or 410.

A grade-point average of 2.00 or higher is required in all physics courses. Courses do not count toward the major if the grade is less than a C.

### Recommended '06-07 Curriculum Physics Major

	Credits	
	F	S
<b>First Year</b>		
CHEM 150, Principles of Chemistry I	3	--
CHEM 151, Principles of Chemistry II	--	3
CSCI 160, Comp Science I	4	--
ENGL 110, College Composition I	3	--
ENGL 120, College Composition II	--	3
MATH 165, Calculus I	4	--
MATH 166, Calculus II	--	4
PHYS 251, Univ Physics I	--	4
PHYS 251L, Univ Physics I Lab	--	1
PHYS 251R, Univ Physics I Recitation	--	1
UNIV 189, Skills for Academic Success	1	--
<b>Totals</b>	15	16

<b>Second Year</b>		
COMM 110, Fund of Public Speaking	--	3
MATH 265, Calculus III	4	--
MATH 266, Intro Diff Equations	--	3
PHYS 252, Univ Physics II	4	--
PHYS 252L, Univ Physics II Lab	1	--
PHYS 252R, Univ Physics II Recitation	1	--
PHYS 350, Intro to Modern Physics	--	3
PHYS 370, Intro to Computational Physics	--	3
Wellness	2	--
Electives	4	4
<b>Totals</b>	16	16

	Credits	
	F	S
<b>Third Year</b>		
MATH 480, Differential Equations	3	--
MATH 483, Partial Differential Equations	--	3
MSUM1 PHYS 330, Intermediate Mechanics	4	--
PHYS 361, Electromagnetic Theory	--	3
PHYS 411/L, Optics for Scientists & Engineers/Lab	3/1	--
PHYS 462, Heat & Thermodynamics	3	--
PHYS 463, Statistical Mechanics	--	3
Humanities & Soc & Behavioral Sci Electives	2	7
<b>Totals</b>	16	16

<b>Fourth Year</b>		
MATH 488, Numerical Analysis I	3	--
MATH 489, Numerical Analysis II	--	3
PHYS 401, Intro to Condensed Matter Physics	--	3
PHYS 471, Advanced Laboratory	2	--
PHYS 485, Quantum Mechanics I	3	--
PHYS 489, Physics Projects	--	3
Electives/General Education	7	6
<b>Totals</b>	15	15

**Curriculum Total** ..... 125

I = MSUM Minnesota State University Moorhead

### Computational Physics Option

Computational physics is a rapidly growing sub-discipline of physics, concerned with computational aspects of physical problems, including computer simulation and numerical techniques for the solution of mathematical equations arising in all areas of physics. As computing power grows, computer modeling is becoming an increasingly important research and development tool. Correspondingly, there is a rising demand for scientists with multidisciplinary training that combines fundamental knowledge of physics with practical skills in computation. The computational physics option recognizes the unique qualifications of students who complete computation-related courses in addition to fulfilling the requirements for the physics majors. Graduates of the option will be qualified to work in industry or to pursue graduate studies in physics, computer science, engineering, or other technical fields.

### Recommended '06-07 Curriculum Computational Physics Option

	Credits	
	F	S
<b>First Year</b>		
CHEM 150, Principles of Chemistry I	3	--
CHEM 151, Principles of Chemistry II	--	3
CSCI 160, Comp. Science I	4	--
ENGL 110, College Composition I	3	--
ENGL 120, College Composition II	--	3
MATH 165, Calculus I	4	--
MATH 166, Calculus II	--	4
PHYS 251, University Physics I	--	4
PHYS 251L, Univ Physics I Lab	--	1
PHYS 251R, Univ Physics I Recitation	--	1
UNIV 189, Skills for Academic Success	1	--
<b>Totals</b>	15	16

<b>Second Year</b>		
COMM 110, Fund of Public Speaking	--	3
CSCI 161, Computer Science II	--	4
MATH 265, Calculus III	--	4
MATH 266, Intro Diff Equations	--	3
PHYS 252, Univ Physics II	4	--
PHYS 252L, Univ Physics II Lab	1	--
PHYS 252R, Univ. Physics II Recitation	1	--
PHYS 350, Intro to Modern Physics	--	3
ECE 173, Intro to Computing	--	3
PHYS 370, Intro to Computational Physics	--	3
Wellness	2	--
Electives	2	--
<b>Totals</b>	17	16

	Credits	
	F	S
<b>Third Year</b>		
MATH 480, Differential Equations . . . . .	3	--
MATH 483, Partial Diff Equations . . . . .	--	3
MSUM1 PHYS 330, Intermediate Mechanics . . . . .	4	--
PHYS 361, Electromagnetic Theory . . . . .	--	3
PHYS 411/L, Optics for Scientists & Engineers/Lab . . . . .	3/1	--
PHYS 462, Heat & Thermodynamics . . . . .	3	--
PHYS 463, Statistical Mechanics . . . . .	--	3
General Education/Electives . . . . .	2	7
Totals . . . . .	16	16

<b>Fourth Year</b>		
MATH 488, Numerical Analysis I . . . . .	3	--
MATH 489, Numerical Analysis II . . . . .	--	3
PHYS 401, Intro to Condensed Matter Physics . . . . .	--	3
PHYS 471, Advanced Laboratory . . . . .	2	--
PHYS 485, Quantum Mechanics I . . . . .	3	--
PHYS 489, Physics Projects . . . . .	--	3
Electives/General Education . . . . .	7	6
Totals . . . . .	15	15
<b>Curriculum Total . . . . .</b>	<b>126</b>	

I = MSUM Minnesota State University Moorhead

**Optical Science and Engineering Option**

This program is for students who wish to prepare for a career as a physicist in photonics or for graduate school in optics or photonics. Today, light is at the core of technologies ranging from computing and communication to surgical techniques. There are more than 5,000 optics-related companies in the United States alone, but even more important, photonics provides the technical foundation for many more. Optical science and engineering has exploded to encompass nearly all fields of science and technology with a consequent shortage of individuals trained in the field. This option provides the necessary interdisciplinary background in physics and electrical engineering through a structured sequence of courses. This is the only program of this type in the region.

**Recommended '06-07 Curriculum Optical Science and Engineering Option**

	Credits	
	F	S
<b>First Year</b>		
CHEM 150, Principles of Chemistry I . . . . .	3	--
CHEM 151, Principles of Chemistry II . . . . .	--	3
ECE 173, Intro to Computing . . . . .	3	--
ENGL 110, College Composition I . . . . .	3	--
ENGL 120, College Composition II . . . . .	--	3
MATH 165, Calculus I . . . . .	4	--
MATH 166, Calculus II . . . . .	--	4
PHYS 251, Univ Physics I . . . . .	--	4
PHYS 251L, Univ Physics I Lab . . . . .	--	1
PHYS 251R, Univ Physics I Recitation . . . . .	--	1
UNIV 189, Skills for Academic Success . . . . .	1	--
General Education/Electives . . . . .	2	1
Totals . . . . .	16	17

<b>Second Year</b>		
COMM 110, Fund of Public Speaking . . . . .	--	3
MATH 265, Calculus III . . . . .	4	--
MATH 266, Intro to Diff Equations . . . . .	--	3
PHYS 252, Univ Physics II . . . . .	4	--
PHYS 252L, Univ Physics II Lab . . . . .	--	1
PHYS 252R, Univ Physics II Recitation . . . . .	--	1
PHYS 350, Intro to Modern Physics . . . . .	--	3
ECE 301, Electrical Engr I . . . . .	--	3
Wellness . . . . .	--	2
General Education/Electives . . . . .	5	4
Totals . . . . .	17	16

	Credits	
	F	S
<b>Third Year</b>		
PHYS 361, Electromagnetic Theory . . . . .	3	--
PHYS 411, Optics . . . . .	3	--
PHYS 411L, Optics Sci & Engr Lab . . . . .	1	--
PHYS 462, Heat & Thermodynamics . . . . .	3	--
PHYS 471, Advanced Laboratory . . . . .	--	2
ECE 303, Electrical Engr II . . . . .	--	3
ECE 417, Optical Signal Trans. . . . .	--	3
General Education/ Electives . . . . .	6	8
Totals . . . . .	16	16

<b>Fourth Year</b>		
MATH 488, Numerical Analysis I . . . . .	3	--
MATH 489, Numerical Analysis II . . . . .	--	3
PHYS 401, Intro to Condensed Matter Physics . . . . .	--	3
PHYS 415, Elements of Photonics . . . . .	--	3
PHYS 485, Quantum Mechanics I . . . . .	3	--
PHYS 489, Physics Projects . . . . .	3	--
ECE 483, Instrumentation for Eng . . . . .	3	--
Electives/General Education . . . . .	3	6
Totals . . . . .	15	15
<b>Curriculum Total . . . . .</b>	<b>127</b>	

**Mathematics and Physics Double Major**

This program is for students who want additional theoretical background and preparation for graduate or a technical career in the sciences. See sample curriculum under Mathematics.

**Physics Minor**

A minor in Physics also is available. Contact the department for details.

**Department of Psychology**

[www.ndsu.edu/ndsu/psychology](http://www.ndsu.edu/ndsu/psychology)  
 Psychology is concerned with behavior, both of human beings and other living organisms. In studying behavior, psychologists rely heavily upon the methods of science. Some areas of psychology are most closely related to the natural and biological sciences while other areas within psychology are more closely related to the social sciences, especially sociology, anthropology, and communication. Both an undergraduate major and an undergraduate minor in psychology are available. Psychology majors may select the degree program that best suits their needs and interests from the B.A. and B.S. tracks outlined in this section.

All majors must complete 30 credits in psychology as listed in the outline for the B.S. degree. Additional courses in psychology may be selected, in consultation with the advisor, from any of those listed under the department's offerings. Courses in the major field may not be taken on a pass/fail basis (except PSYC 494 and 496, which may be graded on a satisfactory/unsatisfactory basis by the instructor).

**Career Orientation Overlays**

An undergraduate education in psychology leads to a number of career choices following graduation. To assist students in preparing for post-graduate work and careers in psychology or related fields, the department has prepared several Career Orientation OverLays (COOLs). COOLs establish curriculum guidelines and suggestions for students who may be interested in a variety of careers, including medicine and neurosciences, business and industry, graduate school in psychology, or mental health and applied psychology. COOLs, when used in conjunction with the counsel of an advisor, are intended to help a student select the best courses within and outside of psychology (e.g., biology for medicine or business for industrial psychology) to suit particular interests and career goals.

**Advising Centers**

Information for students is available on our Web page ([www.psych.ndsu.nodak.edu/advising/index.php](http://www.psych.ndsu.nodak.edu/advising/index.php)) and at the department in Minard Hall. Topics include requirements for majors and minors, COOLs, graduate school, and career information.

**Psychology Major B.S. with a Major in Psychology**

A total of 122 credits is required for a major in psychology leading toward a Bachelor of Science degree. The following requirements must be fulfilled:

**First-Year Experience:** one credit (UNIV 189, Skills for Academic Success)

A. Communication: nine credits (must include ENGL 110, 120, and COMM 110)

B. Quantitative Reasoning: six credits (must include MATH 103 or higher and STAT 330 or 368).

C. Science and Technology: 10 credits from courses in natural sciences, physical sciences, or technology. A minimum of four credits must be in natural and physical sciences. Courses in this category must include Computer Science 114 and a one-credit lab course.

D. Social and Behavioral Sciences and Humanities and Fine Arts: 18 credits that must include:

1. Social and Behavioral Science (not psychology): six credits

2. Humanities and Fine Arts: six credits

3. College requirement: six credits, any humanities or social science courses (not psychology)

E. Wellness: two credits

F. Supporting Track: Each student, in consultation with his or her advisor, must select one of the following tracks. Requirements are in addition to those specified in A-E.

1. Natural science track: 14 additional credits in mathematics, computer science, statistics, and/or science.

2. Social science track: 14 additional credits in social science (other than psychology)

3. A minor in an approved area of study.

G. Psychology: 30 credits as follows:

Required:	Credits
PSYC 111, Intro to Psychology . . . . .	3
PSYC 350, Research Methods I . . . . .	3
PSYC 351, Research Methods II . . . . .	3

**Area 1: At least one from the following:**

PSYC 453, Organizational Psychology . . . . .	3
PSYC 468, Personality . . . . .	3
PSYC 470, Experimental Social Psyc . . . . .	3

**Area 2: At least one from the following:**

PSYC 460, Sensation & Perception . . . . .	3
PSYC 465, Psychobiology . . . . .	3
PSYC 486, Neuropsychology . . . . .	3

**Area 3: At least one from the following:**

PSYC 461, Memory & Knowledge . . . . .	3
PSYC 463, Experimental Developmental Psyc . . . . .	3
PSYC 464, Attention & Thinking . . . . .	3

**Area 4: Capstone Experience**

PSYC 480, History & Systems . . . . .	3
PSYC 489, Honors Thesis . . . . .	2-6

**Electives:**

PSYC, 400-level courses <sup>1</sup> . . . . .	6
PSYC, free choice on course level . . . . .	6

<sup>1</sup> Three credits may be from any combination of PSYC 489, 494, or 496, but may not be taken pass/fail.

- H. Cultural Diversity: three credits (also may be counted in Category D)
- I. Global Perspectives: three credits (also may be counted in Categories C or D)
- J. Electives: To total 122 credits
- K. At least 37 credits must be obtained in 300/400-level courses.

### B.A. with Major in Psychology

Requirements for the Bachelor of Arts degree are the same as the Bachelor of Science degree except as follows:

Under category D. 3, College requirement, 12 credits (not six) are required. Credits from the second year of foreign language cannot be used to fill the Humanities and Fine Arts requirement.

The supporting track (F) is replaced by a foreign language requirement: completion of second-year college level in a single language, or equivalent as defined by the Department of Modern Languages.

### Sample '06-07 Curriculum B.S. with Psychology Major

	<i>Credits</i>	
<i>First Year</i>	<i>F</i>	<i>S</i>
ANTH 111, Intro Anthropology . . . . .	3	--
BIOL 126, Human Biology . . . . .	3	--
CHEM 117, 117L, Chem Concepts & Appl, Lab . . . . .	--	3,1
CSCI 116, Busn Use of Computers <b>or</b>		
CSCI 114, Microcomputer Pkgs . . . . .	--	3-4
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 103, College Algebra <b>or</b>		
MATH 104, Finite Math . . . . .	3	--
PSYC 111, Intro Psyc. . . . .	3	--
SOC 110, Intro Sociology . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	.1	--
Psychology 200-level Elective . . . . .	--	3
Totals . . . . .	16	16-17

<i>Second Year</i>		
COMM 110, Fund of Public Speaking . . . . .	3	--
PSYC 350, Research Meth I . . . . .	3	--
PSYC 351, Research Meth II . . . . .	--	3
STAT 330, Statistics . . . . .	--	3
Humanities Elective . . . . .	3	--
Psychology 200-level Electives . . . . .	.6	3
Social Science Electives . . . . .	--	6
Wellness . . . . .	--	2
Totals . . . . .	15	17

<i>Third Year</i>		
Psychology Required Course . . . . .	--	3
Psychology 200-300-Level Elective . . . . .	.3	--
Psychology 400-Level Elective . . . . .	--	3
Social Science Electives . . . . .	.3	--
Supporting track or minor . . . . .	.6	6
Electives . . . . .	.3	3
Totals . . . . .	15	15

<i>Fourth Year</i>		
Psychology Required Course . . . . .	.3	3
Psychology 400-Level Elective . . . . .	.3	--
Capstone Experience . . . . .	--	3
Supporting Track or Minor . . . . .	.3	3
Electives . . . . .	.6	6
Totals . . . . .	15	15

**Curriculum Total** **124-125**

**Note:** The particular sequence of courses a student chooses will depend upon his or her interests. In choosing electives, a student must satisfy the general requirements for a B.A. or B.S. degree.

### Psychology Minor

A minor in Psychology offers students electing majors in other disciplines the opportunity to complement

their studies with a coherent set of psychology courses. Different courses are compatible with interests and career goals of students in major areas such as business, child development and family science, and computer science. Students planning a psychology minor should consult with a faculty advisor from the Department of Psychology.

Students selecting a minor in Psychology must complete 18 credits in psychology (excluding PSYC 494 or 496). These 18 semester credits must include PSYC 111 (Introduction to Psychology) and at least one 3 credit 300- or 400-level course, and may not be taken pass/fail. At least eight credits must be taken at NDSU.

### Department of Statistics

[www.ndsu.edu/statistics](http://www.ndsu.edu/statistics)

Statistics involve the analysis of numerical data. This ranges from the calculation of simple statistics to the mathematical theory behind very sophisticated statistical procedures. Professionals in areas such as agriculture, pharmacy, business, human development, and the social sciences use statistical tools.

The Department of Statistics offers a major leading to a B.S., M.S., or Ph.D. degree, as well as minors in statistics for both undergraduate and graduate students. The program is flexible enough to be individually planned around prior experience and in accord with professional goals. The program emphasis is on applied statistics, consulting, and computational methods.

### Statistics Major

The Statistics major requirements include at least 24 credits in statistics. These requirements include the following:

<i>Requirements:</i>	<i>Credits</i>
STAT 367, Probability . . . . .	3
STAT 368, Statistics . . . . .	3
STAT 461, Applied Regression Models . . . . .	3
STAT 462, Intro Experimental Design . . . . .	3
STAT 491, Capstone Seminar . . . . .	1

#### *Five courses from the following:*

CSCI 161, Comp Science II <b>or</b>		
CSCI 228, Computing Fund II <b>or</b>		
CSCI 418, Simulation Models . . . . .	3-4	
MATH 429, Linear Algebra . . . . .	3	
STAT 450, Stochastic Processes . . . . .	3	
STAT 451, Bayesian Stat Dec Theory . . . . .	3	
STAT 460, Applied Survey Sampling . . . . .	3	
STAT 463, Nonparametric Statistics . . . . .	3	
STAT 464, Discrete Data Analysis . . . . .	3	
STAT 465, Meta-Analysis Methods . . . . .	3	
STAT 467, Probability/Math Stats I . . . . .	3	
STAT 468, Probability/Math Stats II . . . . .	3	
STAT 470, Stat SAS Programming . . . . .	3	

#### *Additional requirements:*

CSCI 126, Beginning Fortran <b>or</b>		
CSCI 160, Computer Science I <b>or</b>		
CSCI 227, Computing Fund I . . . . .	3-4	
CSCI 222, Discrete Math <b>or</b>		
MATH 270, Intro Abstract Math . . . . .	3	
MATH 129, Basic Linear Algebra . . . . .	2	
MATH 165, Calculus I . . . . .	4	
MATH 166, Calculus II . . . . .	4	
MATH 265, Calculus III . . . . .	4	

**Minor in one of the following:** Social Science, Physical Science, Biological Sciences, Business, Mathematics, or Computer Science (approved by faculty member in that discipline).

If a student were interested in biostatistics, a possible minor would be Biological Sciences. This would include the following set of courses: BIOL 150,

150L, 151, 151L, and 10 credits at the 300-400 level in Biology, Botany, or Zoology.

If a student were interested in business statistics, a possible minor would be Business Administration. (Approval is needed by the College of Business Administration.)

### Recommended '06-07 Curriculum Statistics Major

	<i>Credits</i>	
<i>First Year</i>	<i>F</i>	<i>S</i>
COMM 110, Fund Public Speaking . . . . .	3	--
CSCI 126, Fortran <b>or</b>		
CSCI 160, Comp Science I <b>or</b>		
CSCI 227, Computing Fund I . . . . .	--	3-4
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 165, 166, Calculus I, II . . . . .	4	4
UNIV 189, Skills for Academic Success . . . . .	.1	--
Wellness . . . . .	--	2
Electives <sup>1</sup> . . . . .	.6	3
Totals . . . . .	17	15-16

#### *Second Year*

MATH 265, Calculus III . . . . .	4	--
STAT 367, Probability . . . . .	3	--
STAT 368, Statistics . . . . .	--	3
MATH 129, Basic Linear Algebra . . . . .	--	2
Electives <sup>1</sup> . . . . .	.9	10
Totals . . . . .	16	15

#### *Third Year*

MATH 270, Intro Abstract Math <b>or</b>		
CSCI 222, Discrete Math . . . . .	3	--
STAT 461, Applied Regression Models . . . . .	3	--
STAT 462, Intro Experimental Design . . . . .	--	3
Electives <sup>1</sup> . . . . .	.6	9
STAT Electives . . . . .	.3	3
Totals . . . . .	15	15

#### *Fourth Year*

STAT 491, Capstone Seminar . . . . .	--	1
Electives <sup>1</sup> . . . . .	.9	10
STAT Elective(s) . . . . .	.6	3
Totals . . . . .	15	14

**Curriculum Total. . . . . 122-123**

<sup>1</sup> Electives must be used to satisfy the general education requirements including humanities, social/behavioral sciences, science and mathematics (other than major), and a laboratory course. There are an additional six credit hours in Humanities and Social Sciences required by the College of Science and Mathematics. They also must be used to satisfy the minor requirement.

### Mathematics and Statistics Double Major Pre-Actuarial Science Option

Actuarial science is the study of the evaluation and measurement of risk. The Actuary Science Option is a pre-professional program designed to provide the background needed to enter the field. Entrance into the profession is regulated under a system of examinations run by actuarial professional societies. The curriculum of the option is designed to prepare the student to pass several of these examinations.

The nature of the actuarial profession requires its practitioners to have a broad knowledge of finance, law, mathematics, management, and statistics. This option leads to a double major in mathematics and statistics with either a minor in economics or additional courses in business. Students selecting this option are requested to visit with both the actuarial advisors in the Departments of Mathematics and Statistics early and often to confirm their progress and to inform themselves of changes in the examination curriculum.

### Recommended '06-07 Curriculum Pre-Actuarial Science Option

	Credits	
	F	S
<b>First Year</b>		
COMM 110, Fund of Public Speaking . . . . .	--	3
CSCI 160, 161, Comp Science I, II . . . . .	4	4
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 165, 166, Calculus I, II . . . . .	4	4
STAT 330, Intro Statistics . . . . .	3	--
UNIV 189, Skills for Academic Success . . . . .	1	--
Totals . . . . .	15	14

**Second Year**

ACCT 200, 201, Elements Acct I, II . . . . .	3	3
ECON 201, 202, Prin Micro, Macro . . . . .	3	3
MATH 265, Calculus III . . . . .	4	--
MATH 266, Intro to Diff Equations . . . . .	--	3
MATH 270, Intro to Abstract Math . . . . .	3	--
MATH 429, Linear Algebra . . . . .	--	3
STAT 400-level Elective . . . . .	3	--
STAT 462, Intro/Experimental Design . . . . .	--	3
Totals . . . . .	16	15

**Third Year**

STAT 400-level Electives <sup>2</sup> . . . . .	3	6
MATH 450, Real Analysis I . . . . .	3	--
Science Option <sup>3</sup> . . . . .	6	4
STAT 467, 468, Prob/Math Stat I, II . . . . .	3	3
Humanities & Fine Arts <sup>1</sup> . . . . .	3	3
Electives . . . . .	3	3
Totals . . . . .	18	16

**Fourth Year**

MATH 376, Actuarial Exam/Capstone . . . . .	1	--
MATH 451, Real Analysis II <b>or</b>		
MATH 489, Numerical Analysis II . . . . .	--	3
MATH 488, Numerical Analysis I . . . . .	3	--
STAT 476, Actuary Exam II/Capstone . . . . .	--	1
Busn, Econ or CSCI Electives <sup>3</sup> . . . . .	3	6
Social/Behavioral Science Electives <sup>1</sup> . . . . .	3	3
STAT 461, Applied Regression Models . . . . .	3	--
Statistics 400-Level Electives <sup>2</sup> . . . . .		3
Wellness . . . . .	2	--
Totals . . . . .	15	16

**Curriculum Total . . . . . 125**

A grade of C or better is required in MATH and STAT courses used toward this double major.

To complete a degree, the general education requirements of the College of Science and Mathematics and NDSU need to be met along with this major.

<sup>1</sup> University and College of Science of Mathematics general education requirements include three credits each in courses approved for global perspectives and in cultural diversity. There are an additional six credit hours in Humanities and Social Sciences required by the College of Science and Mathematics.

<sup>2</sup> Statistics electives include any additional 400-level, 3-credit statistics course.

<sup>3</sup> Business, Economics or Computer Science electives must be taken from BUSN 340, 441, 442, 444, ECON 341, 343 or any 400-482 level ECON course, CSCI 453 or CSCI 454.

<sup>4</sup> Science Option: take one of the following combinations (10 credits minimum): BIOL 150/150L, General Biology I/L (3/1) and BIOL 151/151L, General Biology II/L (3/1); or BIOL 220/220L, Anatomy & Physiology I/L (3/1) and BIOL 221/221L, Anatomy & Physiology II/L (3/1); or CHEM 121/121L, General Chemistry I/L (3/1) and CHEM 122/122L, General Chemistry II/L (3/1); or CHEM 150/160, Principles of Chemistry I/L (3/1) and CHEM 151/161, Principles of Chemistry II (3/1); or plus two more credits in Science and Technology category; or PHYS 251/251L, University Physics I/Lab (4/1) and PHYS 252/252L, University Physics II/Lab (4/1).

### Behavioral Statistics Major

This degree is a joint effort between the Department of Statistics and the Department of Psychology. It is recommended that a student wishing to obtain a degree in Behavioral Statistics consult with an advisor in both departments. This major prepares students for careers involving collecting and analyzing data on human behavior, for example, in Medicare, insurance, market research, or health, educational and social services. Graduates of this program are expected to have good quantitative reasoning skills and to have strong people skills. Please note: this curriculum also fulfills requirements for the B.S. in Psychology. See the sample curriculum for this degree.

### Recommended '06-07 Curriculum Behavioral Statistics Major

	Credits	
	F	S
<b>First Year</b>		
ANTH 111, Intro to Anthropology . . . . .	3	--
BIOL 126, Human Biology . . . . .	3	--
CSCI 114, Microcomputer Packages <b>or</b>		
CSCI 116, Business Use of Computers . . . . .	--	3-4
CHEM 117, Chemical Concepts & App. . . . .	--	3
CHEM 117L, Chemical Concepts Lab . . . . .	--	1
ENGL 110, 120, College Composition I, II . . . . .	3	3
MATH 103, College Algebra <b>or</b>		
MATH 104, Finite Mathematics . . . . .	3	--
PSYC 111, Intro to Psychology . . . . .	3	--
SOC 110, Intro to Sociology . . . . .	--	3
PSYC 200-Level Elective . . . . .	--	3
UNIV 189, Skills for Academic Success . . . . .	1	--
Totals . . . . .	16	16-17

**Second Year**

COMM 110, Fund of Public Speaking . . . . .	--	3
PSYC 350, Research Methods I . . . . .	--	3
STAT 330, Intro Statistics . . . . .	3	--
STAT 331, Regression Analysis . . . . .	--	2
Humanities Electives . . . . .	3	3
PSYC 200-Level Electives . . . . .	6	3
Social Science Elective . . . . .	3	--
Wellness . . . . .	2	--
Totals . . . . .	17	14

**Third Year**

PSYC 351, Research Meth II . . . . .	3	--
STAT 460 <sup>3</sup> , Applied Survey Sampling <b>or</b>		
STAT 463 <sup>3</sup> , Nonparametric Statistics <b>or</b>		
STAT 465 <sup>3</sup> , Meta-Analysis Methods . . . . .	3	--
STAT 462, Intro/Experimental Design . . . . .	--	3
PSYC Required Course <sup>2</sup> . . . . .	--	3
PSYC 200- or 300-Level Elective . . . . .	3	--
PSYC 400-Level Elective . . . . .	--	3
Social Science Elective . . . . .	3	--
Electives <sup>1</sup> . . . . .	3	6
Totals . . . . .	15	15

**Fourth Year**

STAT 460 <sup>3</sup> , Applied Survey Sampling <b>or</b>		
STAT 463 <sup>3</sup> , Nonparametric Statistics . . . . .	3	--
STAT 470, Statistical SAS Program . . . . .	--	3
Behavioral Stat Capstone Exp. . . . .	--	3
PSYC Required Courses <sup>2</sup> . . . . .	3	3
PSYC 400-Level Elective . . . . .	3	--
Electives <sup>1</sup> . . . . .	6	5
Totals . . . . .	15	14

**Curriculum Total . . . . . 122-123**

<sup>1</sup> Electives must be used to satisfy the general education requirements. There are an additional six credit hours in Humanities and Social Sciences required by the College of Science and Mathematics.

<sup>2</sup> Psychology Requirements:

- A. Social Bases of Behavior
  - PSYC 453, Organizational Psyc
  - PSYC 468, Personality
  - PSYC 470, Exp Social Psyc

B. Biological Bases of Behavior

- PSYC 460, Sensation & Perception
- PSYC 465, Psychobiology
- PSYC 486, Neuropsychology

C. Cognitive Bases of Behavior

- PSYC 461, Memory & Knowledge
- PSYC 463, Experimental Developmental Psyc
- PSYC 464, Attention & Thinking

<sup>3</sup> Students need only take two of the following three Statistics courses: STAT 460, 463, 465. STAT 460 and 463 are offered during alternate fall semesters. STAT 465 is offered during alternate spring semesters.

**Note:** Students must meet the university's general education requirements as well as the curriculum requirements in effect at the time of entrance into a program.

### Statistics Minors

Two different minors in statistics are offered.

**Applied Statistics (Track 1):** This minor consists of 17 credits in statistics including STAT 330, 331, and four approved 400-level, three-credit STAT courses.

**Statistics (Track 2):** Requirements for this minor are STAT 367, 368, 331 or 461, 462, MATH 165, 166, and one other approved 400-level, three-credit STAT course. A Department of Statistics (Waldron 201) advisor for minors must approve the program.

# COLLEGE OF UNIVERSITY STUDIES

[www.ndsu.edu/univ\\_studies](http://www.ndsu.edu/univ_studies)

Morrill 112 (701) 231-7014

David A. Wittrock, Dean

Programs in the College of University Studies are designed for students with general needs or unique goals. These programs involve general studies for deciding students or the Bachelor of University Studies degree (a tailored degree program) for students with distinctive educational goals.

## General Studies

The general studies program is designed to serve new students who wish to enter college but are unsure about their plans for the future. Special attention is given to selecting the best advisors, giving students a chance to explore a variety of fields, and acquainting them with people who are familiar with post-graduation opportunities.

Students in general studies may elect any pattern of courses for which they have satisfactory preparation. They may carry as little as one course (usually three hours of class a week), a full load of four or five courses, or on rare occasions, as many as six or seven courses.

Transfer to other colleges on campus from this program or into this program is possible at any time. Most students elect to pursue a major in one of the other academic units at NDSU by the end of their third semester.

## Bachelor of University Studies Degree

Students with no fewer than 15 semester credits remaining and wishing to tailor their own degree may do so by proposing a plan of study. Upon approval, this plan of study leads to a Bachelor of University Studies degree.

Students seeking the Bachelor of University Studies degree usually begin by visiting the director's office and talking with an advisor about their long-range hopes and aspirations. Together, they select an advisor whose professional skills and interests most closely coincide with those of the student. The advisor is a faculty member who will work with the student in preparing a statement of goals, a summary of previous education and experience, and a plan of study for the degree. After both have signed the proposal, it is forwarded to the Academic Policies/Program Review committee of the College of University Studies for approval. If the program is approved by the committee, it becomes a set of requirements for graduation. Each program must meet the general education requirements and the graduation requirements of the university.

## Experiential Learning Credit

Students may gain credit for university-level experiential learning depending on how their experience relates to their educational objectives and the pattern of formal education they plan to pursue. Students requesting credit for university-level experience must prepare summaries of their learning, including time periods, job descriptions, responsibilities, on-the-job training, verification of employment, and any other pertinent information according to published guidelines. Credit may be requested for any type of experience provided the experience leads to university-level learning and is related to educational goals. Ultimately, students must be prepared to demonstrate increased knowledge, problem-solving ability, ability to understand people,



or some other significant personal growth as the result of their experience.

## Cooperative Education

Cooperative Education, a program of the Career Center, offers undergraduate and graduate students an opportunity to integrate classroom study with paid, career related work experience for academic credit. Work may be full or part time. Credit is granted through Continuing Education and awarded directly by the Cooperative Education program. A Cooperative Education experience may substantially improve students' employment opportunities after graduation.

## Degree Plan Proposal

The degree plan must be submitted to the Academic Policies/Program Review committee through the Office of the Director of University Studies by guideline due dates (October 1 for spring or summer graduation; February 1 for fall graduation). No fewer than 15 credits must be proposed (remain to be taken after approval) and included in the proposal. Students who submit proposals after the due date will not be considered for graduation the following semester. Students are encouraged to submit their proposals during the junior year with approximately 30 credits proposed.

A program must include the following: at least one semester (15 credits) of study to be completed after approval; a total of no fewer than 122 credits (including credit for military experience, previous college work, work experience, etc.); 37 credits of junior- and senior-level courses (300-400 level); a cumulative grade-point average of 2.00 based on all work completed at North Dakota State University; 60 credits from a four-year institution; and the residency requirement (36 credits must be completed at North Dakota State University). Ordinarily, the last 30 credits must be resident credits. In addition, each program must fulfill the General Education requirements including the Capstone Experience, Cultural diversity, and Global Perspectives categories and have as a minimum the following:

### Requirements

First-Year Experience	1
Communication	9*
COMM 110, Fund Public Speaking	(3)
ENGL 110, 120, College Composition I, II	(6)
Quantitative Reasoning	3
Science & Technology	10
A laboratory course is included in this requirement.	
Humanities & Fine Arts	6
Social & Behavioral Sciences	6
Wellness	2
Capstone	1
Total	38

\*Effective fall 2007, students entering NDSU will be required to complete an upper-level, writing intensive course as part of the general education requirements.

Approval of a student's proposal means that everybody involved believes that the approved plan is the best educational program available to that student and that it is a baccalaureate-level program.

It is the policy of the College of University Studies that students seeking a B.U.S. degree will, following approval of the B.U.S. proposal, be expected to make continual progress toward completion of their degree. Discontinuing enrollment for a period of two continuous academic years or more indicates lack of progress. The proposals of students who lack progress will no longer be considered valid for graduation with a B.U.S. degree. If these students choose to continue to seek a B.U.S. degree, it will be necessary to submit a new proposal for consideration by the committee.

In addition to the College of University Studies continual progress policy, NDSU requires that any student who discontinues enrollment for more than one year is subject to completing the General Education requirements in effect at the time of re-entry. B.U.S. proposals are subject to the NDSU baccalaureate degree requirements.

### For further information, contact:

Carolyn A. Schnell, Director  
College of University Studies  
112 Morrill Hall  
North Dakota State University  
Fargo, ND 58105  
Telephone: 231-7014  
[www.ndsu.edu/univ\\_studies](http://www.ndsu.edu/univ_studies)

## INTERDISCIPLINARY PROGRAMS

Interdisciplinary study involves an integration of more than one discipline and perspective on a topic. North Dakota State University offers several interdisciplinary programs at both the undergraduate and graduate levels. The undergraduate programs listed in this section are offered through collaborative partnerships of departments in more than one academic college. Programs offered by multiple departments within the same academic college are listed in their respective college sections.

### Biotechnology

[www.ag.ndsu.nodak.edu/plantsci](http://www.ag.ndsu.nodak.edu/plantsci)

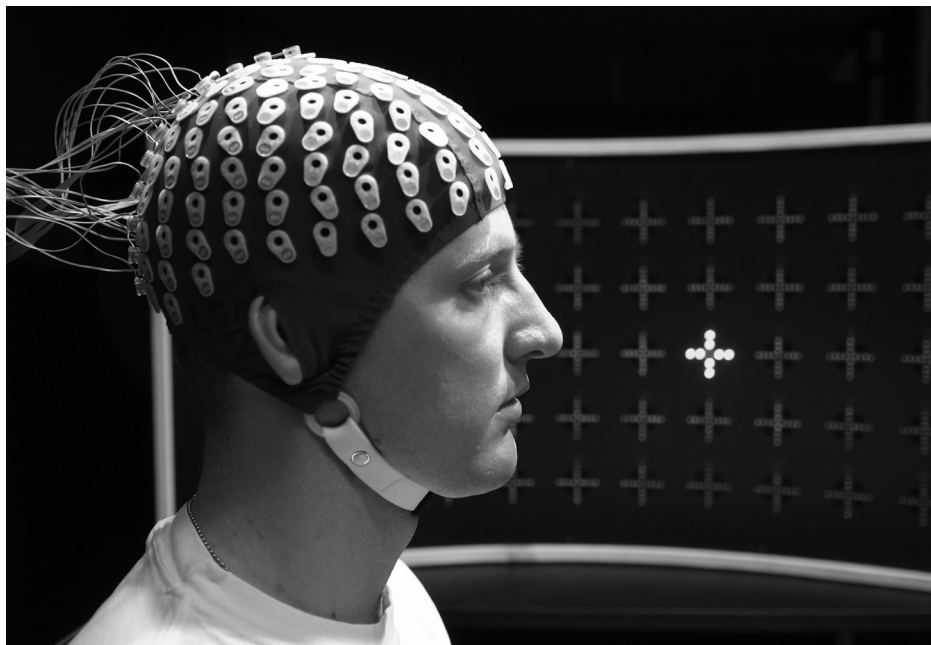
Biotechnology is an interdisciplinary field based on a combination of biology and technology. It includes the application of science and technology to the design of new plants, animals, and microorganisms that have improved characteristics. The methodologies include the use of recombinant DNA for gene cloning and gene transfers between organisms, culture of plant and animal cells and tissues, fusion of animal cells or plant protoplasts, and the regeneration of whole plants from single cells.

Biotechnology also is concerned with the large-scale fermentation processes that utilize some of these novel organisms for the production of pharmaceuticals, diagnostic tests for diseases, feed additives, enzymes, and hormones.

Biotechnology offers seemingly unlimited opportunities to combine genes from related or unrelated species to produce useful organisms with desirable properties that were not previously found in nature. The development of crop plants that are resistant to herbicides or insects, the production of human growth hormone and insulin by genetically engineered bacteria, and the development of unique vaccines are all examples of successful biotechnology.

The Biotechnology program is offered in either the College of Agriculture, Food Systems, and Natural Resources or the College of Science and Mathematics and leads to the Bachelor of Science degree. The curriculum is designed to provide students with knowledge and experience in both basic and applied sciences. Students have an opportunity to work with scientists in various areas including, animal science, biology, botany, chemistry, horticulture, microbiology, plant pathology, plant science, and zoology. Faculty in each of the cooperating life-science departments has been identified to serve as advisors for students who select the biotechnology major. Graduates of this program have excellent opportunities for employment in the biotechnology industry or for graduate education.

Students majoring in biotechnology are required to perform a research project in the laboratory of a faculty member/scientist, and to prepare a senior thesis describing their research project. A 2.50 institutional grade-point average is required to remain in the program.



### Recommended Curriculum Biotechnology Major

<i>First Year</i>	<i>Credits</i>
BIOL 150, 150L, Gen Biology I & Lab . . . . .	3,1
BIOL 151, 151L, Gen Biology II & Lab . . . . .	3,1
CHEM 121, 121L, Gen Chemistry I & Lab . . . . .	3,1
CHEM 122, 122L, Gen Chemistry II & Lab . . . . .	3,1
ENGL 110, 120, College Composition I, II . . . . .	6
MATH 146, 147, Applied Calculus I, II . . . . .	8
UNIV 189, Skills for Academic Success . . . . .	1
Wellness . . . . .	2
Total . . . . .	33

<i>Second Year</i>	<i>Credits</i>
CHEM 341, 341L, Organic Chemistry I/Lab . . . . .	3,1
CHEM 432, Organic Chemistry II . . . . .	3
MICR 350, 350L, Gen Microbiology & Lab . . . . .	3,1
PHYS 211, 211L, College Physics I & Lab . . . . .	3,1
PHYS 212, 212L, College Physics II & Lab . . . . .	3,1
PLSC 315, 315L, Genetics & Lab . . . . .	3,1
Computer Science . . . . .	3
Social & Behavioral Sciences, Humanities & Fine Arts Electives . . . . .	6
Additional Writing or Speech Course . . . . .	3
Total . . . . .	35

<i>Third Year</i>	<i>Credits</i>
BIOC 460, 461, Found of Biochemistry & Molecular Biology I, II . . . . .	8
COMM 110, Fund of Public Speaking . . . . .	3
MICR 470, Basic Immunology . . . . .	3
MICR 471, Immunology & Serology Lab . . . . .	2
STAT 330, Intro to Statistics . . . . .	3
*Biotechnology Elective . . . . .	2-3
Social & Behavioral Sciences, Humanities & Fine Arts Electives . . . . .	9
Biotechnology Seminar . . . . .	1
Total . . . . .	31-32

#### *Fourth Year*

BIOC 465, Prin of Physical Chem/Biophysics . . . . .	4
BIOC 474, Methods in Recombinant DNA Tech . . . . .	3
BOT 380, Plant Physiology <b>or</b> ZOO 460, Animal Physiology . . . . .	4
MICR 482, Bacterial Genetics & Phage . . . . .	3
Biotechnology Seminar . . . . .	1
*Biotechnology Elective . . . . .	2-3
Senior Research . . . . .	2-4
Senior Thesis . . . . .	1
Social & Behav Sciences, Humanities & Fine Arts Elective . . . . .	3
Free Elective . . . . .	6
Total . . . . .	29-32
<b>Curriculum Total . . . . .</b>	<b>128-132</b>

\*Students must meet the university's general education requirements as well as the curriculum requirements in effect at the time of entrance into a program.

#### *\*Biotechnology Electives*

<i>(2 courses required):</i>	<i>Credits</i>
ARSC 263, Intro to Animal Biotechnology . . . . .	3
BIOC 473, Methods of Biochem Research <b>or</b> PSCI 409, Isotope Tracer Tech . . . . .	3
BIOC 475, Computer Appl in Biochem & Molecular Biology . . . . .	3
BIOC 485, Industrial Biotechnology . . . . .	3
BIOC 487, Molecular Biol of Gene Expression . . . . .	3
BIOL 310L, Methods in Cell & Molecular Biol . . . . .	1
BIOL 440, Biotechnology & Ethics . . . . .	2
MICR 445, Animal Cell Culture Techniques . . . . .	2
PPTH 453, Microscopy . . . . .	3
PLSC 411, Genomics . . . . .	3
PLSC 484, Plant Tissue Culture & Micropropagation 2	

## Biotechnology Minor

A minor in biotechnology requires satisfactory completion of 22 credits in the following courses. A minimum of eight credits must be taken at NDSU.

<b>Required:</b>	<b>Credits</b>
BIOC 460, 461, Found of Biochem	
& Molecular Biology I, II. . . . .	8
PLSC 315, 315L, Genetics & Lab . . . . .	3,1

### **Electives in Biotechnology Technique**

#### **(2 courses required):**

BIOC 473, Methods of Biochem Research. . . . .	3
BIOC 474, Methods in Recombinant DNA Tech . . .	3
BIOC 485, Industrial Biotechnology . . . . .	3
MICR 445, Animal Cell Culture Techniques . . . . .	2
PPTH 453, Microscopy . . . . .	3
PLSC 484, Plant Tissue Culture & Micropropagation	2

### **Electives in Specialized Areas (6 credits):**

BOT 380, Plant Physiology . . . . .	4
MICR 470, Basic Immunology . . . . .	3
MICR 471, Immunology & Serology Lab . . . . .	2
MICR 482, Bacterial Genetics & Phage. . . . .	3
PPTH 324, Intro to Plant Pathology . . . . .	3
ZOO 370, Cell Biology . . . . .	3
ZOO 460, Animal Physiology . . . . .	4

## Fraud Investigation Minor

The Department of Accounting and Information Systems, in collaboration with the Department of Criminal Justice and Political Science, offers a minor in Fraud Investigation. Students will study the causes of fraud, as well as the detection, investigation, and prevention of fraud. Students learn about the criminal justice system including law making, criminality, and prosecution of fraud and other types of crime. This minor will prepare students for possible careers in crime investigation, litigation support, or forensic accounting.

Contact the Department of Accounting and Information Systems or the Department of Criminal Justice and Political Science for specific course and minimum grade-point average requirements.

## Gerontology Minor

A minor in Gerontology is sponsored through the College of Human Development and Education and the College of Arts, Humanities and Social Sciences. It makes use of the Tri College University resources to provide students with an integrated understanding of the process of aging, aging services, and the aged in America. There are six basic areas of study. Students should follow the directions provided for each of the areas.

**Note:** CC = Concordia College

MSUM = Moorhead State University Moorhead

NDSU = North Dakota State University

### **Credits**

#### **Area 1: Social Gerontology**

SOC 440, Sociology of Aging . . . . .	3
---------------------------------------	---

#### **Area 2: Developmental Psychology of Aging**

Select one of the following courses:

CDFS 460, Adult Development & Aging . . . . .	3
PSYC 471, The Psychology of Aging . . . . .	3

#### **Area 3: Wellness & Aging**

CDFS 182, Wellness & Aging . . . . .	3
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### **Area 4: Macrosystems**

Select one of the following courses:

CDFS 481, Women & Aging. . . . .	3
CDFS 482, Family Dynamics of Aging . . . . .	3

### **Area 5: Internship/Practicum**

Each student must complete the equivalent of three semester credits of internship-practicum. Please contact Dr. Dan Klenow or Dr. Greg Sanders for details.

**Note:** Students who have completed an internship related to Gerontology for their current major can request to substitute their credits of elective course work from Area 6.

### **Area 6: Electives**

One additional elective course is required for the minor. Select this course from the following list.

CDFS 357, Personal & Family Finance . . . . .	3
CDFS 491, Seminar/Aging related. . . . .	1-3
H&CE 468, Family Life & Adult Educ Programs . . .	3
HNES 452, Nutrition, Health, & Aging . . . . .	3
SOC 426, Sociology of Medicine. . . . .	3
SOC 441, Sociology of Death . . . . .	3
SOC 442, Current Issues in Medicine . . . . .	3
SOC 491, Seminar/Aging related. . . . .	Var
Total minimum . . . . .	18

## Great Plains Institute of Food Safety

[www.ndsu.edu/foodsafety](http://www.ndsu.edu/foodsafety)

A multidisciplinary team of faculty with expertise in food safety from various departments within NDSU's Colleges of: Agriculture, Food Systems, and Natural Resources; Arts, Humanities and Social Sciences; Human Development and Education; and Science and Math has formed the Great Plains Institute of Food Safety and developed a unique educational experience for NDSU students. The comprehensive food safety curriculum leads to B.S., M.S., and Ph.D. degrees in Food Safety, an Undergraduate Minor in Food Safety and a Graduate Certificate in Food Protection (see website for complete curriculum requirements). All these programs are unified around the single issue of food safety, an area of concern for many Americans, the current target of tremendous interest, effort, and spending worldwide, and an area in which shortages of expertise are manifest. Students in food safety have successfully found employment in the food safety area.

The curriculum is based on contemporary educational theory and employs experiential learning techniques to foster development of students' critical-thinking abilities, collaborative and problem-solving skills, and awareness of employment opportunities. The core undergraduate and graduate courses are team-taught and use a "hands on" approach to learning. Courses are fully integrated so that students have the opportunity to troubleshoot food-safety issues from "farm-to-fork." The program promises to meet students' present and future educational needs.

## Recommended Curriculum Food Safety (SAFE) Major

### **First Year**

AGRI 150, Ag Orientation. . . . .	1
AGRI 189, Skills for Academic Success . . . . .	1
BIOL 150, 150L, General Biology, Lab . . . . .	3,1
CHEM 121, 121L, General Chemistry I, Lab . . . . .	3,1
CHEM 122, 122L, General Chemistry II, Lab . . . . .	3,1
COMM 110, Fund of Public Speaking . . . . .	3
ENGL 110, 120, College Composition I, II. . . . .	3,3
Humanities/Fine Arts/Cultural Diversity . . . . .	6
Free Electives . . . . .	3
Total. . . . .	32

### **Credits**

### **Second Year**

ECON 201, Microeconomics . . . . .	3
ECON 202, Macroeconomics . . . . .	3
CFS, 210 Intro to Food Sci & Tech . . . . .	2
CHEM 341, 341L, Organic Chemistry I, Lab . . . . .	3,1
CHEM 342, Organic Chemistry II . . . . .	3
MATH 146, Applied Calculus I. . . . .	4
PHYS 211, 211L, College Physics I, Lab . . . . .	3,1
STAT 330, Intro Statistics . . . . .	3
Wellness. . . . .	2
Writing Elective (upper division) . . . . .	3
Total. . . . .	31

### **Third Year**

ARSC 340, Meat Science & Technology . . . . .	3
BIOC 460, Found of Biochem/Molecular Biol. . . . .	4
CFS 450, Cereal Technology . . . . .	3
MICR 350, 350L, General Microbiology I, Lab. . . . .	3,1

### **Credits**

MICR 460, 460L, Pathogenic Microbiology, Lab. . . . .	3,2
SAFE 450, Food Safety for the Food Industry . . . . .	3
SAFE 470, Economic, Epidemiologic & Regulatory Issues in Food Safety. . . . .	3
SAFE 485, Crisis Communication. . . . .	3
Free Electives . . . . .	6
Total. . . . .	34

### **Fourth Year**

CFS 460, 461, Food Chemistry, Lab . . . . .	3,1
CFS 464, Food Analysis. . . . .	3
CFS 470, 471, Food Processing, Lab . . . . .	3,1
MICR 453, Food Microbiology . . . . .	3
SAFE 452, Food Laws & Regulations. . . . .	3
SAFE 464, Etiology of Foodborne Illness. . . . .	3
SAFE 474, Epidemiology. . . . .	3
Free Electives . . . . .	9
Total. . . . .	32

**Curriculum Total. . . . . 129**

\* This sample curriculum is not intended to serve as a curriculum guide for current students, but rather an example of course offerings for prospective students. For the curriculum requirements in effect at the time of entrance into a program, consult with an academic advisor.

## Food Safety Minor

Students may minor in Food Safety by completing a total of 16 credits. Required courses are: SAFE 450, 464, 470, plus a minimum of seven credits approved by the department. A minimum of eight credits must be taken at NDSU.

## International Studies Major

The International Studies major is a secondary major that is offered concurrently with a student's primary program of study. This program provides students with the opportunity to internationalize their major by combining special requirements to obtain the international studies major with their academic field of study. Students complete 27 credits of course work including an integrative senior project, demonstrate proficiency in a foreign language, and participate in an experience abroad to complete a second major in International Studies.

**Courses.** In addition to the courses required for the primary major, students seeking the International Studies major are required to take courses that have an international focus. These include a 12-credit core and nine credits of electives that will be chosen with the help of the student's advisor. An integrative senior project that ties international study to the primary degree also is required.

**Languages.** Knowledge of a foreign language is an important part of the program. At NDSU students may study Arabic, French, German, and Spanish. Additional language study is available through the Tri-College University in languages such as Norwegian, Russian, Japanese, and Chinese. Foreign language proficiency equivalent to completion of two years of college language study is required. This requirement may be met either through appropriate course work or through a testing procedure in the Department of Modern Languages.

**Experience abroad.** An important part of the international studies major is participation in a study, work, or research experience abroad for at least 10 weeks in duration. Assistance with finding an overseas study program is available in the Office of International Programs.

**Selective admission.** To be eligible to participate in the International Studies major, students must have sophomore standing with a minimum grade-point average of 2.5. Eligible students also must have initiated advanced level course work in their academic major and completed the first year or equivalent of their foreign language study. Additional information about the International Studies major and curriculum requirements are available through the department of a student's academic major, the college International Studies advisor, the Department of Modern Languages, and the Office of International Programs.

## Logistics Management Minor

Working in conjunction, the College of Business, the Upper Great Plains Transportation Institute, and the Department of Agribusiness and Applied Economics offer a minor in Logistics Management. Companies directly involved with transportation as well as companies in the retail and wholesale sectors increasingly rely on an effective and efficient logistics system to remain competitive. In addition, the public sector also utilizes individuals with logistics and supply chain management skills.

A minor in Logistics Management requires a minimum of 19 credits: BUSN 350, 481, 491, AGEC 378, IME 470, 480, and three credits of an approved elective. In addition, students must earn a 2.50 cumulative grade-point average based upon the courses used in the minor. A minor approval form and fee are required.

## School of Natural Resources

[www.ag.ndsu.edu/nrm](http://www.ag.ndsu.edu/nrm)

With increasing human pressure and a growing need to balance competing demands, our world needs new and better ways to manage society's impacts on the environment. The School of Natural Resources (SNR) is dedicated to preparing students for challenging careers requiring the holistic ecological perspective and global social perspective necessary for examining and solving complex natural resources management problems. Our goal is the highest and best societal uses of natural resources while maintaining the integrity of life-sustaining ecological systems. Career opportunities abound in federal, state and local government, the private sector, non-profit conservation and environmental organizations, as well as higher education and research.

The SNR offers an interdisciplinary major in Natural Resources Management (NRM) leading to a Bachelor of Science (BS) degree. Students benefit from faculty engagement from four colleges in the coordination of the program, classroom teaching and advising. Students may earn a B.S. degree from any one of the participating colleges: College of Agriculture, Food Systems, and Natural Resources; College of Engineering and Architecture; and College of Science and Mathematics. Students earning their degree from the College of Science and Mathematics must complete an additional six units in humanities and social sciences (to total 134 units).

During the first four semesters of the NRM program, students complete a broad foundation of core courses in the social, biological, and physical sciences. The second half of the program offers students the opportunity to focus on a specific area of interest - an emphasis. NRM offers six emphasis areas, each allowing students the flexibility to select courses for specialized career preparation.

**Biotic Resources Science** deals with basic scientific principles that govern the interrelationship between biotic (e.g., plants, animals) and abiotic factors (e.g., climate, soils) in major ecosystems and the use of these principles for environmentally sound management of both natural and agro-ecosystems.

**Environmental Communication** is designed for environmentally oriented students preparing for careers in communication fields such as journalism, public relations, broadcast media and the internet.

**Natural Resources Economics** prepares students for management, administrative, regulatory, and policy positions that require a broad understanding of natural resources management and allocation.

**Physical/Earth Resources Sciences** leads to an understanding of the physical and chemical aspects of ecosystems. Topics of study include hydrology, water management and quality, waste management, soil properties, energy resources and land-use management.

**Pollution Science** focuses on the principles and practices of managing natural resources for pollution control. Topics include the technical aspects of pollution as they relate to water, air/solids, earth/soils, and the impact of environmental pollution on biotic factors. Students interested in this emphasis are strongly urged to complete College Algebra before entering the NRM program.

**Social Science** concentrates on human factors (social, political, anthropological) in environmental management and environmental disaster management, while recognizing constraints and opportunities presented by physical and biological factors.

## Recommended Curriculum Natural Resources Management Major

	Credits	
	F	S
AGRI 189, Skills for Academic Success . . . . .	1	--
ANTH 111, Intro to Anthropology . . . . .	3	--
BIOL 150, 150L, General Biology I/Lab . . . . .	--	4
BIOL 151, 151L, General Biology II/Lab . . . . .	4	--
ECON 201, Prin of Microeconomics . . . . .	--	3
ENGL 110, 120, College Composition I, II . . . . .	3	3
NRM 150, Natural Resource Mgt Orient . . . . .	1	--
NRM 225, Natural Resources & Agro-ecosystems . . . . .	--	3
Core Elective <sup>1</sup> . . . . .	3	3
<b>Total . . . . .</b>	<b>15</b>	<b>16</b>

Second Year		
BIOL 364, Gen Ecology . . . . .	--	3
CHEM 121, 121L, Gen Chemistry I/Lab . . . . .	4	--
COMM 110, Fund of Public Speaking . . . . .	3	--
ECON 202, Prin of Macroeconomics . . . . .	3	--
GEOL 105, Physical Geology <sup>1</sup> . . . . .	3	--
NRM/ASM 264, Nat Resource Mgmt Sys . . . . .	--	3
SOIL 210, Intro to Soil Science . . . . .	--	3
STAT 330, Intro Statistics <b>or</b> Math 166, Calculus II <sup>2</sup> . . . . .	--	3-4
Wellness . . . . .	--	2
Core Elective <sup>3</sup> . . . . .	3-4	3
<b>Total . . . . .</b>	<b>16-17</b>	<b>17-18</b>

<sup>1</sup>Math 103: College Algebra or math placement; Pollution Science students must take Math 105, Trigonometry.

<sup>2</sup>Pollution Emphasis only.

<sup>3</sup>Pollution Science students must take MATH 165, Calculus I and ME 221, Engineering Mechanics I. Natural Resource Economics students must take MATH 146, Applied Calculus I.



**Natural Resources Management Emphasis Areas**

	<i>Natural</i>					
	<i>Biotic Resources</i>	<i>Environ. Comm.</i>	<i>Resources Economics</i>	<i>Phys/Earth Science</i>	<i>Pollution Science</i>	<i>Social Sciences</i>
<b>Third Year</b>						
AGEC 375, Applied Agricultural Law	3	3	3	3	3	3
ASM 259, Meas in Nat Resource Mgmt	1	1	1	1	1	1
ECON 481, Nat Resource Economics	3	3	3	3	3	3
HIST 333, Environmental History	3	3	3	3	3	3
Humanities & Fine Arts Electives	3	3	3	3	3	3
PHIL 215, Contemporary Moral Issues	3	3	3	3	3	3
Emphasis Required Courses	3	10	9	8	19	7
Emphasis Electives	15	8	8	10	0	11
Totals	34	34	33	34	35	34
<b>Fourth Year</b>						
ANTH 462, Cultural Ecology	3	3	3	3	3	3
GEOG 455, Intro to Geographic Infor Sys <i>or</i> ARSC 452, Geographic Infor Sys in Range Survey	3	3	3	3	3	3
NRM 491, Seminar/Capstone	2	2	2	2	2	2
Emphasis Required Courses	3	3	3	5	0	0
Emphasis Electives	19	19	19	17	18	22
Totals	30	30	30	30	26	30

**Women's Studies**

[www.ndsu.nodak.edu/womens\\_studies](http://www.ndsu.nodak.edu/womens_studies)

**The goal of Women's Studies include:**

to examine the contributions of women to all aspects of society, to explore the intersections of race, class, sexual orientation, age, and physical ability with gender both globally and nationally, to investigate the heritage, challenges and concerns of women, and to provide a newer and broader understanding of women in all fields.

A Women's Studies program provides the benefits of a liberal arts education with an emphasis on critical thinking, writing, and organizational skills, making oral presentations, and expands the traditional acknowledgement that a liberal education produces well-rounded individuals. There also are multiple practical applications of a Women's Studies major. With more women in the workplace, businesses must be able to address issues such as sexual harassment, flex-time, and equal opportunity not only with sensitivity but from a knowledge base.

**Women's Studies Major**

The major consists of 36 credits, including a 15 credit core, nine hours of general Women's Studies elective classes, and 12 hours of topic-intensive work. (Women and Liberal Arts, Women and Families, Women and Health, Women and Work, and Women and Public Policy). Many of the courses in the topic-intensive electives are at Concordia College and MSUM.

**Recommended Curriculum Women's Studies**

	<i>F</i>	<i>S</i>	<i>Credits</i>
<b>First Year</b>			
COMM 110, Fund of Public Speaking	3	--	
ENGL 110, 120 College Composition	3	3	3
UNIV 189, Skills for Academic Success	1	--	
Hum/Fine Arts Gen Ed Requirement	--	3	
Quantitative Reasoning Gen Ed	3	--	
Science & Tech Gen Ed	--	3	
Social/Behavioral Gen Ed	3	3	3
WS 110, Intro to Women's Studies	--	3	
Wellness	2	--	
Total	15	15	

<b>Second Year</b>			
Hum/Fine Arts Gen Ed	--	3	
Hum AH&SS College Requirement	--	3	
Fine Arts AHSS College Requirement	3	--	
Science/Tech Gen Ed with Lab	--	4	
Science/Tech Gen Ed	3	--	
WS 350, Perspectives in Women's Studies	3	--	
Minor Courses	3	3	3
Women's Studies General Electives	3	3	3
Total	15	16	

<b>Third Year</b>			
Soc 412, Sociology of Sex Roles	3	--	
Soc 424, Feminist Theory & Discourse	3	--	
Soc/Behavioral AHSS College Requirement	3	--	
AHSS Additional Course	--	3	
Minor Course	3	3	3
Women's Studies General Elective	--	3	
Women's Studies Topic Electives	3	3	3
University Electives	--	3	
Total	15	15	

<b>Fourth Year</b>			
Minor Elective	6	3	
Electives	7	6	
Women's Studies Topic Electives	3	3	
WS 489, Internship/Capstone	--	3	
Total	16	15	
<b>Curriculum Total</b>	<b>122</b>		

**Women's Studies Minor**

The Women's Studies minor is an interdisciplinary program appropriate as a complement to various majors. This minor is particularly useful in acquiring perspectives that complement traditional studies for developing leadership roles or for pursuing careers that involve women's concerns. A student selecting this minor must complete the following requirements:

<i>Women's Studies Minor</i>	<i>Credits</i>
<b>Required Core Courses</b>	
WS 110, Intro to Women's Studies	3

**and Three of the following courses:**

ADFH 382, Women in Management	3
CDFS 242, Marriage & the Family	3
CDFS 468, Women in Economic Systems	3
COMM 412, Gender & Communication	3
ENGL 330, British & American Women Writers	3
ENGL 331, Contemporary Women Writers	3
HIST 260, Women in America	3
POLS 351, Women in Politics	3
SOC 412, Sociology of Sex Roles	3
SOC 413, Sociology of Work	3
SOC 424, Feminist Theory & Discourse	3
WS 350, Perspectives in Women's Studies	3

Elective courses (additional credits, for a total of 18 credits including any course(s) listed above but not taken for core credit)

	<i>Credits</i>
ART 453, Topics in Art History: Women in Art	3
CDFS 230, Life Span Development	3
CDFS 353, Children, Families, & Public Policy	3
CDFS 462, Family Crisis	3
CDFS 475, Children & Families Across Cultures	2
ENGL 335, Multicultural Writers	3
HIST 259, Women & European History 1400-1800	3
HIST 265, Families in America	3
PSYC 210, Human Sexuality	3
PSYC 250, Developmental Psychology	3
SOC 202, Minorities & Race Relations	3
SOC 417, Sociology of the Family	3
SOC 439, Social Change	3
WS 491, Women's Week of Awareness	1
WS 494, Indep Study in Appropriate Area	1-3
Total Minimum	18

At least three credits must be taken in each of the two colleges offering the minor — the College of Arts, Humanities and Social Sciences and the College of Human Development and Education.

# GRADUATE SCHOOL

[www.ndsu.edu/gradschool/](http://www.ndsu.edu/gradschool/)

Old Main 201 (701) 231-7033

David A. Wittrock, Dean

The Graduate School presents advanced programs leading to the Master of Science, Master of Arts, Master of Business Administration, Master of Education, Master of Music, Master of Architecture, Master of Military Logistics, Education Specialist, Doctor of Musical Arts, Doctor of Education, Doctor of Nursing Practice, and Doctor of Philosophy degrees. Graduate certificates may also be earned. Graduate degrees offered and subject matter fields are listed at the end of this section. For more complete details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/index.shtml](http://www.ndsu.edu/gradschool/bulletin/index.shtml).

The Graduate School offers superior students the opportunity to develop their capabilities in given areas. Graduate study is particularly recommended for those students whose interests and aptitudes carry them beyond routine application. Graduate students are encouraged to develop powers of independent thought and to become familiar with the conduct of research.

The Graduate School extends and enlarges the work of the undergraduate programs and supports specialized training, research, and scholarly expression.

Graduate programs are administered by the graduate dean assisted by a Graduate Council composed of six elected and six appointed faculty members, and two appointed graduate students.

## Admission to Graduate Study

The Graduate School encourages applicants to apply to graduate programs using our electronic application (<http://www.ndsu.edu/gradschool/apply/index.shtml>). Every applicant must complete an application form, as well as a Reasons for Graduate Study Statement, and return it to the Graduate School. Arrangements must be made for official transcripts of all previous course work to be sent to the Graduate School. Additionally, the applicant should indicate the names of three individuals who will provide letters of reference. Some departments require Graduate Record Examination (GRE) scores. Education and Counseling and Guidance may require scores on the Miller Analogies Test (MAT) or the Graduate Record Examination (GRE). Applications to the Master of Business Administration program must include Graduate Management Admission Test (GMAT) scores.

Processing time requires that international student applications must be received by the Graduate School prior to May 1 for Fall Semester and prior to August 1 for Spring Semester.

Admission to the Graduate School is open to qualified graduates of universities and colleges of recognized standing without regard to age, race, color, gender, sexual orientation, religion, national origin, disability, or Vietnam-era veteran status. Admission to the Graduate School is a selective process intended to identify applicants who are outstanding among recipients of baccalaureate degrees.

The following minimum qualifications are required of all students seeking an advanced degree:



1. The applicant must have a baccalaureate degree from an educational institution of recognized standing. Applicants in the process of completing the baccalaureate degree must submit final transcripts indicating the awarded degree before enrollment at NDSU.
2. The applicant must have adequate preparation in the chosen field of study and must show potential to undertake advanced study and research, as evidenced by academic performance and experience.
3. At the baccalaureate level, the applicant must have earned a cumulative grade-point average in all courses of at least 3.0, or equivalent, to attain full standing in a graduate degree program. Students with a previous graduate degree for which the GPA was at least 3.0, or equivalent, may be admitted in full standing.
4. Each department or program may set higher qualifications and may require the submission of additional evidence of academic performance.

A student is permitted to register in the Graduate School only after formal admission. Departments or programs make recommendations on all applications, but the final admission decision is the responsibility of the graduate dean.

## Registration Procedure

For first-time registration, consult with the department chair or designee, or your major advisor and complete the necessary forms for on-site registration. Thereafter, consult with an advisor in advance of registration to plan courses to meet your degree requirements.

## Fees for Graduate Students

Fees are listed in the section titled Student Financial Information and Services[N1].

## General Requirements for Master's Degrees

Minimum requirements for all master's degrees include the following items:

### Supervisory Committee

The student, with the approval of the department/program chair, will select a major advisor. The major advisor-student relationship must be mutually acceptable. The major advisor will act as the chair of the student's supervisory committee and will be in charge of the Plan of Study. In addition to the major advisor, two additional members must be agreed upon by the advisor and student. One of these members must be from the faculty. The other member may be either a faculty member or a qualified off-campus expert in the field, depending upon the department. A fourth committee member serves as a Graduate School appointee.

The student and major advisor, in consultation with all other supervisory committee members, will develop a tentative Plan of Study, consisting of not fewer than 30 graduate semester credits. The Plan of Study must bear the signatures of the supervisory committee and be approved by the chair of the major department, the academic dean, and the graduate dean before it is official. It may be revised as advisable and necessary but must be filed with the Graduate School not later than the term immediately after the supervisory committee is formed. Revisions may be made later but must be approved by the student, all supervisory committee members, the chair of the student's department, and the graduate dean.

The supervisory committee is encouraged to convene at least once per semester and meet at least once per year to review the progress of the student's graduate program.

## Number of Credit Hours

Candidates for the master's degree are required to earn a minimum total of 30 credits in appropriate and approved 600- and 700-level courses.

## Residence Requirement

No degree is given without at least one full year of academic work in residence. The residence requirement may be met by residence at the institution for two full semesters on a full-time basis. Part-time students earn residence in proportion to the number of credits earned.

## Transfer of Credit

All graduate credits used to meet the requirements of a master's degree must be approved by the supervisory committee, the department/program chair, the academic dean, and the graduate dean. A candidate for the master's degree must petition in order to transfer up to a maximum of nine (9) semester hours of graduate credit from another institution to satisfy course requirements on the Plan of Study.

**Note:** Educational Leadership Program course requirements taken through Tri-College are not considered transfer credits and may be included on Plans of Study without petition. All other graduate credits earned through Tri-College University are considered transfer credits.

## Time Limitation

All requirements for the master's degree must be completed within a period of seven (7) consecutive years. Graduate credit for any course work that is more than seven calendar years old at the time of the final examination may not be used to satisfy degree requirements.

## Final Examination

Candidates earning a M.S. or M.A. degree shall pass a final examination before being awarded the master's degree. The supervisory committee shall serve as the examining committee of which the major advisor shall serve as chair. Committee member substitutions must be approved by the graduate dean.

The final examination shall cover course work taken by the candidate, the thesis, paper, or other activity (e.g. portfolio), and knowledge fundamental thereto. The final examination shall be held and passed before the student can participate in commencement.

## Degree Requirements Master of Science

The Master of Science (M.S.) degree is offered in two options: Thesis Option (available in all departments) or Comprehensive Study Option (not available in all departments). The Thesis Option emphasis is on research and ability to analyze data and to prepare a scholarly thesis, whereas the Comprehensive Study Option emphasis is on a broader understanding of a major area.

In those departments offering both options, the choice should be made jointly by the student and the major advisor, based upon the nature of the responsibilities for which the student is preparing.

Under the guidance of the major advisor, each candidate shall prepare a thesis or paper to be approved by the chair of the major department, all members of the supervisory committee, and the graduate dean. The thesis contributes no fewer than six (6) and no more than ten (10) credits toward the minimum 30 required credits. The paper contributes no fewer than two (2) and no more than four (4) credits toward the minimum 30 required credits. The thesis or paper

bearing the approval of the major advisor shall be in the hands of the examining committee seven days before the oral examination. The candidate shall consult the major advisor regarding the form in which the thesis or paper is to be presented. Guidelines for thesis or paper preparation are available on the Graduate School's Web page.

After the final examination, the student incorporates into the thesis or paper corrections suggested at the oral examination. The thesis or paper, along with the Checklist for Dissertations, Theses, and Papers and a receipt from the Business Office indicating that completion fees have been paid, is then presented to the Graduate School for review and format checking by the disquisition editor. Five final copies of the thesis or paper, bearing the approval of the major advisor, other supervisory committee members, and the department chair, are to be presented, unbound, to the Graduate School. Two bound copies of the thesis or paper go the university library. The remaining three bound copies are for the student, the student's advisor, and student's department.

## Master of Arts

Candidates for the Master of Arts (M.A.) degree will meet the preceding general requirements and those specific requirements in the humanities, and social and behavioral sciences departments that offer the M.A. degree. The additional requirements normally include two years of a foreign language.

## Master of Business Administration

The Master of Business Administration (M.B.A.) degree is a non-disquisition, professional degree program structured to serve qualified students with any undergraduate degree.

## Master of Education

The Master of Education (M.Ed.) degree is a non-disquisition, practitioner-oriented degree for teachers and school counselors. Candidates for this degree will meet the preceding general requirements as well as specific requirements established by the School of Education.

## Master of Music

The Master of Music (M.M.) is the professional master's degree in music designed for (1) performers, conductors, and music industry professionals wishing to augment and refine their skills, (2) music teachers wishing to update and increase their knowledge, especially in content areas of performance and/or conducting, and (3) those wishing to teach music at the college level. Two tracks are offered: Performance and Conducting. Each requires a minimum of 30 credits. Students in the D.M.A. program may receive the M.M. after completion of all requirements, and all work taken in the M.M. may apply to parallel tracks in the D.M.A.

## Master of Architecture Degree

The Master of Architecture (M.Arch.) is the professional degree for architects wishing to enter the profession. The M.Arch. requires 30 graduate credits in the structured architecture curriculum beyond the four-year pre-professional Bachelor of Science in Environmental Design degree offered at NDSU.

## Master of Military Logistics

The M.M.L. is a professional degree program targeted specifically at career military officers and Department of Defense (DoD) civilians. The degree is tailored to the DoD's strategic goals of joint officer development and logistics transformation.

The M.M.L. in Transportation and Logistics allows students, who are selected by DoD and NDSU, to develop advanced knowledge and research skills. The key emphasis areas are: joint military logistics and transportation, advanced supply chain management, integration of technology with supply-chain and enterprise resource planning, and the integration of homeland security and crisis management issues with military logistics. The M.M.L. degree program provides students with a comprehensive integrated knowledge of joint military logistics and transportation, which will enable them to be successful in the ever-changing field of military operations.

## Master of Science, Master of Education, and Education Specialist in Educational Leadership

Candidates for the Master of Science, Master of Education, and Education Specialist in Educational Leadership degrees will meet the requirements established by the Tri-College University Educational Leadership program. Additional information outlining these requirements is available on request from the College of Graduate and Interdisciplinary Studies.

## Doctor of Philosophy

Only a brief summary of the requirements for the Ph.D. degree is listed. (For details, see the Graduate Bulletin online at [www.ndsu.edu/gradschool/bulletin/](http://www.ndsu.edu/gradschool/bulletin/))

The Doctor of Philosophy degree is awarded in recognition of high scholarly attainment as evidenced by a period of successful advanced study, the satisfactory completion of certain prescribed examinations, and the development of an acceptable dissertation covering some significant aspect of a major field of learning.

## Plan of Study and Supervisory Committee

See this section under General Requirements for the master's degree. The minimum number of semester credits is 90. Thirty (30) of them may be satisfied with a previous master's degree.

## Residence Requirement

Graduate study for the Doctor of Philosophy degree normally requires a minimum of three (3) years of full-time study beyond the baccalaureate degree. A student who has a master's degree or equivalent must devote at least one of the two remaining academic years of study in residence at North Dakota State University.

## Time Limitation

All requirements for the Doctor of Philosophy degree must be completed within a period of 10 consecutive years. Graduate credit for any course work, not included in the master's degree, that is more than 10 calendar years old at the time of the final examination may not be used to satisfy degree requirements.

## Language Requirements

Each graduate department will determine whether it will require a language and, if so, the language or languages applicable to the candidate's field of study and the level of reading proficiency required. Low-level proficiency will measure the candidate's comprehension of material in the major field in the foreign language with unlimited use of linguistic reference sources (e.g., dictionaries, glossaries, etc.); high-level proficiency will measure a similar reading comprehension with limited use of such reference sources. All examinations will be administered under the supervision of the Department of Modern Languages. International students whose native language is not English may satisfy the language requirement in their native language, providing their graduate department approves. In these cases, the basis for proficiency will be the candidate's use of English, rather than the foreign language. The certificate testifying to proficiency in the foreign language must be filed with the graduate dean before the student may be admitted to the comprehensive/preliminary examination in those cases where the department requires a foreign language.

## Examinations

**Comprehensive /Preliminary Examination:** This examination will be required of each student after the greater portion of courses has been completed and any required language proficiency has been certified. The examination consists of both written and oral parts. After passing the comprehensive/preliminary examination, the student will be formally admitted to candidacy for the Doctor of Philosophy degree. At least one academic semester must elapse between the comprehensive/preliminary examination and the final examination.

## Final Examination

This examination will be taken after the candidate has completed the course work and dissertation. This is an oral examination that is concerned primarily with the dissertation, but may also include material from course work, especially courses fundamental to the dissertation.

## Dissertation

The dissertation must show originality and demonstrate the student's capacity for independent research. It must embody results of research that constitute a definitive contribution to knowledge.

## Doctor of Education

The Doctor of Education (Ed.D.) degree requires extensive field service involving qualitative and/or quantitative research, leading to a dissertation that will apply a theory at an institution (application of theory). This is a professional degree designed to meet the pragmatic expectations in the field of education.

## Doctor of Musical Arts

The Doctor of Musical Arts (D.M.A.) is the terminal professional practical degree in music, designed for performers and conductors wishing to acquire the highest performance abilities. Graduates will have attained the academic qualifications generally accepted for teaching at the college level. Two tracks are offered: Performance and Conducting. Each track requires a minimum of 90 credits beyond the baccalaureate degree (93 for the D.M.A. in choral conducting). Students entering the program with an approved master's degree or its equivalent may apply credits toward the D.M.A. The graduate music faculty will determine the viability and number of transfer credits.

## Doctor of Nursing Practice

The D.N.P. is the professional nursing degree for advanced nursing practice, designed for registered nurses desiring to provide advanced nursing care for clients. Graduates will have met academic and clinical practice requirements for national certification as a nurse practitioner or clinical nurse specialist.

## General Regulations

The following rules pertain to all graduate programs of study at NDSU:

## Scholastic Standards

Graduate study demands a substantially greater effort on the part of the student than undergraduate study. The graduate student must maintain an overall average of B or better in all courses taken as a graduate student. Grades lower than C will not be accepted for graduate credit. Thesis, paper, and dissertation grades will be recorded as satisfactory or unsatisfactory.

## Credit Courses

Courses approved at the 600 and 700 level may be taken for graduate credit and used to satisfy course requirements on the graduate Plan of Study. Courses that a student has used to fulfill the requirements of a baccalaureate degree may not be used on that student's graduate Plan of Study.

## Credit Load

A full-time graduate load is nine (9) credits. Graduate assistants in half-time status (0.5 FTE) are considered full time if registered for four (4) or more graduate credits. Graduate students wishing to register for more than twelve (12) credits in a regular semester shall secure the approval of their academic dean and the graduate dean.

## Graduate Study by Faculty Members

A member of the faculty may not receive an advanced degree or certificate from the department in which they hold an appointment.

## Individualized Plans of Study

To be most effective, graduate study must provide for the individual interests, needs, and abilities and should not be subject to rigid, detailed regulation. Therefore, the graduate dean is authorized to consider each case according to the recommendations of the program committee.

## Graduate Degrees Granted

Degrees offered are Master of Science, Master of Arts, Master of Education, Master of Business Administration, Master of Music, Master of Architecture, Master of Military Logistics, Education Specialist, Doctor of Musical Arts, Doctor of Education, Doctor of Nursing Practice, and Doctor of Philosophy. Graduate certificates also are available.

The following programs of study are offered at the master's degree level:

- Agribusiness and Applied Economics
- Agricultural and Biosystems Engineering
- Agricultural Education
- Animal and Range Sciences
- Architecture
- Biochemistry
- Biology
- Botany
- Business Administration
- Cereal Science
- Chemistry
- Child Development and Family Science
- Civil Engineering
- Coatings and Polymeric Materials
- Computer Science
- Criminal Justice
- Counseling
- Education
- Educational Leadership
- Electrical and Computer Engineering
- Emergency Management
- English
- Entomology
- Environmental and Conservation Science
- Environmental Engineering
- Family and Consumer Sciences Education
- Food Safety
- Genomics and Bioinformatics
- History
- Horticulture
- Industrial Engineering and Management
- International Agribusiness
- Manufacturing Engineering
- Mass Communication
- Mathematics
- Mechanical Engineering
- Merchandising
- Microbiology
- Music
- Natural Resources Management
- Nursing
- Nutrition and Exercise Science
- Pharmaceutical Sciences
- Physics
- Plant Pathology
- Plant Sciences
- Psychology
- Social Science
- Sociology
- Software Engineering
- Soil Science
- Speech Communication
- Statistics, Applied
- Transportation and Logistics
- Zoology

The **Education Specialist** degree may be earned in Educational Leadership through the Tri-College University.

*The following programs of study are offered at the doctoral degree level:*

Agricultural and Biosystems Engineering  
 Animal and Range Sciences  
 Biochemistry  
 Botany  
 Cellular and Molecular Biology  
 Cereal Science  
 Chemistry  
 Civil Engineering  
 Coatings and Polymeric Materials  
 Communication  
 Computer Science  
 Criminal Justice  
 Education  
 Electrical and Computer Engineering  
 Emergency Management  
 Engineering  
 Entomology  
 Environmental and Conservation Science  
 Food Safety  
 Genomics and Bioinformatics  
 History  
 Human Development  
 Industrial and Manufacturing Engineering  
 Materials and Nanotechnology  
 Mathematics  
 Mechanical Engineering  
 Molecular Pathogenesis  
 Music  
 Natural Resources Management  
 Nursing Practice, Advanced  
 Pharmaceutical Sciences  
 Physics  
 Plant Pathology  
 Plant Sciences  
 Psychology  
 Software Engineering  
 Soil Science  
 Statistic  
 Transportation and Logistics  
 Zoology



## Course Descriptions

Courses approved at the time of publication are listed in this bulletin. Not all courses are offered every term. Refer to the online schedule of courses each term and Campus Connection for listed offerings.

### Definitions

Course descriptions frequently include additional information about enrollment. Students are responsible for complying with restrictions or expectations related to course enrollment listed herein or in any supplementary information.

**Course credits:** Credits are stated in semester units as defined in the Academic Policies section in this bulletin.

**Course prerequisites (Prereq):** Prerequisites indicate the academic background, academic level, or other requirements considered necessary for enrollment in the course. Most prerequisites are specific courses, however, equivalent preparation is usually acceptable.

**Course corequisites (Coreq):** Corequisites indicate courses to be taken concurrently with the course described. Instructor or department permission may override a prerequisite or corequisite.

**Cross-listed courses:** A cross-listed course means the same course is offered by two or more departments or under another course prefix. Cross-listed courses are noted and the full description appears under the department responsible for the course. Credit may only be earned for the course under one of the prefixes.

**Dual-listed courses:** Dual-listed courses with 400- or 500- and 600-level course numbers permit undergraduate and graduate students in the same class. The same amount of credit for the course is earned by all students, but additional work is required of students enrolled under the graduate level number. Credit may only be earned for the course at one of the levels.

### Designators

• **(CCN)** - This abbreviation indicates the course has a common number, title, and description throughout ND University System institutions. Common courses offered at NDSU are listed in the Appendix.

• **(ND:\_\_\_)** - This designator has various abbreviations following the colon to indicate the general education category for which the course has been approved by the ND University System for transfer to other System institutions. General Education Requirement Transfer Agreement (GERTA) designators are the following: (ND:COMPSC) computer science, (ND:ENGL) English composition, (ND:FA) fine arts activities, (ND:HIST) history, (ND:HUM) humanities, (ND:LABSC) laboratory science, (ND:MATH) mathematics, (ND:SCI) science and technology, (ND:COMM) speech, and (ND:SS) social science. For more GERTA information, refer to the Academic Policies section in this bulletin.

**Note:** NDSU general education requirements and approved courses are available in Academic Policies in this bulletin, and online at [www.ndsu.edu/registrar](http://www.ndsu.edu/registrar).

### Format of Course Listings

All university course offerings, listed alphabetically by areas of study, are described on the following pages. Course information and course availability is subject

to change. The heading, which precedes the brief description of each course, includes the current course number; former course number, if any, in brackets; course title; a CCN indicator, if any; and the number of semester credit hours, fixed or variable. Enrollment information, such as prerequisites and corequisites follows. The frequency the course is offered may appear at the end of the description. F = Fall, S = Spring, SS = Summer Session. Terms presented in a fraction indicate course is offered alternate years. F/2 = every other Fall semester.

### Course Numbers

Course numbers indicate the student classification for which the course is primarily intended. Some course numbers end with a letter suffix: L - laboratory course; R - recitation (undergraduate) or research continuation (graduate); S - graduate project. The number system is as follows:

- 100 series courses - open to freshmen <sup>1</sup>
- 200 series courses - primarily for sophomores
- 300 series courses - primarily for juniors
- 400 series courses - primarily for seniors
- 500-599 series courses - post-baccalaureate professional courses
- 600 numbered courses - Continuing Education post-baccalaureate courses, not applicable toward graduate degrees
- 601-699 series courses - graduate courses taught concurrently in the same classroom with advanced undergraduates at the 400 or 500 level
- 700-799 series courses - open to graduate students

<sup>1</sup>Any 100-level course offered for non-degree credit is noted in the course description.

**Notes:** A bracketed course number or prefix [ ] indicates that the number or prefix of the same course has changed since the last publication of the bulletin. Double credit cannot be earned by repeating a course unless the course description indicates otherwise.

Graduate standing is required for 600-700 level courses unless prior approval to use the course for an undergraduate program of study is granted by the department/instructor.

### Uniform Course Numbers

The following courses may be offered by departments but are described here because of their uniform numbers and descriptions.

**(Prefix) 291, 391, 491 (CCN); 590, 690, 790 Seminar** 1-5

A group of students engaged, under a professor or professors, in research or criticism and in presentation of reports pertaining thereto.

**(Prefix) 292, 392, 492 Study Abroad** 1-15

Pre-arranged study at accredited foreign institutions or in approved study abroad programs. Prereq: Sophomore standing and prior approval by major department. Graded P or F.

**(Prefix) 194, 294, 394, 494 (CCN) Individual Study** 1-5

Individual student work on research or criticism under the supervision of a professor.

**(Prefix) 196, 296, 396, 496 (CCN); 595, 695, 795 Field Experience** 1-15

Field-oriented supervised learning activities outside the college classroom that include a preplanned assessment of the experience, registration during the term the

experience is conducted, and post evaluation with the instructor. Departmental approval.

**(Prefix) 297, 397, 497 (CCN) Cooperative Education** 1-4

Practical application of classroom learning through employment in supervised career-related positions. Students are granted full-time student status by the University regardless of the actual credit hours. Requires departmental approval and Co-op Program application.

**(Prefix) 199, 299, 399, 499 (CCN); 596, 696, 796 Special Topics** 1-5

A group study of the known and established literature of a field, or other evidence, for purposes of scholarly development.

**(Prefix) 379 Study Tour Abroad** 1-6

NDSU faculty directed, part-term experience or field study in a foreign country. Conducted in English for residence credit. Prereq: Prior approval by the Office of International Programs and major department. May be repeated. Graded P or F.

**(Prefix) 592, 692, 792 Case Studies** 1-3

Critical review, analysis, and evaluation of selected topics by individual presentations and group discussions. Case study topics are indicated by title on the student's transcript. Graded S or U.

**(Prefix) 593, 793 Individual Study/Tutorial** 1-5

Directed study allowing an individual student under faculty supervision to undertake selected, independent work in topics of special interest or a limited experience in research. Requires departmental approval.

**(Prefix) 594, 794 Practicum/Internship** 1-8

Course designed to provide practical participation under professional supervision in selected situations to gain experience in the application of concepts, principles, and theories related to the student's area of specialization. Requires approved program and consent of instructor. Graded S or U.

**(Prefix) 791 Temporary/Trial Topics** 1-5

University-wide course focused on group study involving critical examination and discussion of subject matter selected for proposal as a temporary or trial course.

**(Prefix) 797 Master's Paper** 1

Literature review, research, and preparation for paper required for the comprehensive study option. Graded S or U.

**(Prefix) 797R Paper Continued Registration** 1-3

Continued registration for graduate paper. Only for students in a department/program with a limit on enrollment for paper credits. Graded S or U.

**(Prefix) 797s Comprehensive Project** 1-6

An in-depth research study/project in a graduate student's field of study. Prereq: Graduate standing.

**(Prefix) 798**  
**Master's Thesis** 1-10  
 Original investigation under the supervision of a major adviser and a supervisory committee. Graded S or U.

**(Prefix) 798R**  
**Thesis Continued Registration** 1-3  
 Continued registration for graduate thesis. Only for students in a department/program with a limit on enrollment for thesis credits. Graded S or U.

**(Prefix) 798s**  
**Specialist Field Study** 1-6

**(Prefix) 799**  
**Doctoral Dissertation** 1-15  
 Original investigation under the supervision of a major adviser and an advisory committee. Graded S or U.

**(Prefix) 799R**  
**Dissertation Continued Registration** 1-3  
 Continued registration for graduate dissertation. Only for students in a department/program with a limit on enrollment for dissertation credits. Graded S or U.

## ACCOUNTING (ACCT)

Brown, Clifton, Dietz, Dowdell, Glatt, Jorgenson, Klamm, Olsen, Snyder

### COURSES

*(All courses 300 level and above require a minimum of junior standing.)*

**102 Fundamentals of Accounting (CCN)** 3  
 Introduces financial statements and other accounting information to make personal and business decisions. Not available to majors and accounting minors in the College of Business Administration.

**200 Elements of Accounting I (CCN)** 3  
 Study of the basic concepts of accounting applied to businesses and the use of accounting information as a basis for decision-making. The focus is on financial accounting. Prereq: Sophomore standing. Coreq: CSCI 116.

**201 Elements of Accounting II (CCN)** 3  
 Study of the basic concepts of accounting applied to businesses and the use of accounting information as a basis for decision-making. The focus is on managerial accounting. Prereq: ACCT 200.

**311, 312 Intermediate Accounting I, II** 4 each  
 Intensive study of accounting theories, corporate accounting problems, financial statements and disclosures, problems in income determination, and other evolving issues in accounting. Prereq: ACCT 201, 311 respectively.

**318 Taxation in Management Decisions** 3  
 Study of the fundamental concepts of tax implications that result from common business transactions. Prereq: ACCT 102 or 201. Cross-listed with BUSN.

**320 Cost Management Systems** 3  
 Study of cost management methods used to assign costs, and plan and evaluate business activities. Prereq: ACCT 201.

**321 Government and Not-for-Profit Accounting** 3  
 Study of accounting standards and procedures applicable to government and not-for-profit institutions. Prereq: ACCT 201. Recommended: ACCT 311.

**342 Fundamentals of Financial Planning** 3  
 Introduction to the concepts of personal financial planning: investing, budgeting, insurance, taxes, retirement and estate planning. Prereq: ACCT 201.

**410/610 Fraud Examination** 3  
 Study of the pervasiveness and causes of fraud in society; examination of methods of fraud detection and prevention, and on the investigation of financial statement fraud. Prereq: ACCT 201.

**411 Advanced Fraud Examination** 3  
 Advanced application of fraud examination principles that encompass the investigation and prevention of fraudulent financial transactions. Coursework is focused on the analysis of fraudulent financial statements and fieldwork involving actual organizations. Prereq: ACCT 410.

**413 Accounting Internship** 3  
 Supervised professional experience in a non-paid position. May be repeated.

**415/615 Advanced Accounting** 3  
 Study of advanced topics including consolidated statements, international operations, and derivative financial instruments. Prereq: ACCT 312.

**418/618 Tax Accounting I** 3  
 Study of the theory and principles related to the determination of taxable income and computation of federal income taxes for individuals. Students will prepare manual and computerized tax returns. Prereq: ACCT 201.

**419/619 Tax Accounting II** 3  
 Study of the theory and principles related to the determination of taxable income and computation of federal income taxes for partnerships, corporations, trusts and estates, and other specialized tax issues. Prereq: ACCT 418/618.

**420/620 Accounting Information Systems** 3  
 Study of conceptual and practical aspects of accounting information systems with a focus on business processes. Practical application includes use of software in a lab setting. Prereq: MIS 370. For 420: ACCT 311. For 620: ACCT 312.

**421/621 Auditing I** 3  
 Study of audit principles and practices including evidence gathering, internal controls, sampling and testing, report writing, ethics and legal liabilities. Prereq: ACCT 312.

**422/622 Auditing II** 3  
 Advanced application of audit principles in organizational situations through case studies and the investigation of current issues in auditing. Prereq: ACCT 421/621

**430 Tax Practice and Research** 3  
 Study of the fundamental concepts of tax practice and tax research methods. Prereq: ACCT 418. Coreq: ACCT 419.

**440 Management Control Systems** 3  
 Study of the design, implementation, and use of management accounting control systems. Prereq: ACCT 320.

**720 Strategic Cost Management** 3  
 Study of management's use of cost management methods to plan and evaluate business activities.

## AEROSPACE STUDIES (AS) (AIR FORCE ROTC)

Ash, Chair; Korver, Moon, Wentzell, Yackley

### COURSES

**110 Air Force ROTC Fitness** 1  
 Physical Training classes are designed to make students aware of the benefits of being physically fit and participating in lifetime fitness programs. May be repeated. F, S

**111 The Air Force Today I** 1  
 Introduces students to the United State Air Force and provides an overview of the basic character, missions, and organization of the Air Force. F

**112 The Air Force Today II** 1  
 Continuation of AS 111; provides an overview of the basic characteristics, missions and organization of the Air Force. S

**210 Leadership Laboratory** 1  
 Introduction to Air Force customs and courtesies, drill and ceremonies, and military structure. May be repeated. F, S

**211 Evolution of USAF Air and Space Power I** 1  
 Introduction to Air Force heritage and leaders, Air Force concepts, ethics and values, leadership, and the application of both oral and written communication skills. Course content covers air power history from 1783-1960. F

**212 Evolution of USAF Air and Space Power II** 1  
 Continuation of AS 211, includes an introduction to Air Force heritage and leaders, Air Force concepts, ethics and values, leadership, and the application of both oral and written communication skills. Prepares cadets for Field Training. Course content covers air power history from 1960 to the intermediate future. S

**321 Air Force Leadership/Management I** 3  
 Introduction to leadership and management within the USAF, in both theory and practical application emphasizing communication skills (in both oral and written Air Force formats) and interpersonal skills. F

**322 Air Force Leadership/Management II** 3  
 Study of leadership from the military perspective emphasizing situational leadership and contemporary issues including change management and professional ethics. Case studies are used to illustrate leadership concepts. Officer professional development topics are discussed. S

**410 Leadership Laboratory** 1  
 Development of leadership skills in a practical, supervised laboratory. Students must instruct, supervise, and lead junior cadets participating in AS 210, and perform high-level management functions with the cadet corps organization. May be repeated. F, S

**441 Preparation for Active Duty I** 3  
 A study of the national security process, regional studies, advanced leadership ethics and Air Force doctrine. Topics include the military as a profession, officership, military justice, civilian control of the military, and current issues. Application of communication skills is included. F

**442 Preparation for Active Duty II** 3  
 A continuation of AS 441. Topics include the military as a profession, officership, military justice, civilian control of the military, and current issues. Continued

application of communication skills and preparation for a new officer's first active duty assignment. S

## AGRICULTURAL AND BIOSYSTEMS ENGINEERING (ABEN)

Backer; Chair, Bon, Disrud, Panigrahi, Pryor, Solseng, Steele, Wiesenborn

### COURSES

<b>110 Introduction to Agricultural and Biosystems Engineering</b>	2
Introduction to the agricultural and biosystems engineering profession with emphasis on engineering problem solving. 2 lectures. F	
<b>189 Skills for Academic Success</b>	1
See University Interdisciplinary Studies for description.	
<b>255 Computer-Aided Analysis and Design</b>	3
Application and use of software for engineering design, analysis, and graphical communication. 3 lectures. F	
<b>263 Biological Materials Processing</b>	3
Processing equipment design and physical properties of biological materials that influence their harvesting, handling, processing, storage, marketing, and quality evaluation. 2 lectures, 1 three-hour laboratory. Prereq: ABEN 255. S	
<b>358 Electric Energy Application in Agriculture</b>	3
Electrical distribution/services. Electrical control units, solid state and digital electronics, electromagnetic sensors, and sensing techniques with applications to food, agricultural, and biological systems. 2 lectures, 1 three-hour laboratory. Prereq: PHYS 252. F	
<b>377 Numerical Modeling in Agricultural and Biosystems Engineering</b>	3
Numerical modeling using finite element and other techniques. Engineering applications include modeling of stress/strain, heat, and mass transfer in physical, natural resource, and biological systems such as grain and food products. 3 lectures. Prereq: MATH 266, ME 223. S	
<b>383 Structural Design for Biosystems</b>	3
Study of framing systems, building materials, and load requirements. Analysis and design of structures for biosystems. 3 lectures. Prereq: ME 223. F	
<b>444/644 Transport Processes</b>	3
Energy and mass transport principles applied to biological and environmental systems. Prereq: MATH 266 and CE 309 or ME 352. S	
<b>452/652 Bioenvironmental Systems Design</b>	3
Study of psychrometrics, heat and mass transfer, and physiological requirements for livestock and bioproducts. Design of environmental modification and control systems. 3 lectures. Prereq: CE 309, ME 350. F	
<b>458/658 Food Process Engineering</b>	3
Analysis and design of food processing equipment and plants. Emphasis is on application of fluid flow, thermodynamics, and heat and mass transfer principles. 3 lectures. Prereq: Junior standing. F	
<b>464/664 Resource Conservation and Irrigation Engineering</b>	4
Engineering principles and design of systems for soil and water resource management and environmental	

protection. 3 lectures, 1 three-hour laboratory. Prereq: CE 309. S

<b>473/673 Agricultural Power</b>	3
Theory, analysis, and testing of internal combustion engines, traction, power trains, hydraulic systems, vehicle dynamics, stability, and ergonomics in tractor design. Electrical power units including motors. Alternative energy systems. 2 lectures, 1 three-hour laboratory. Prereq: ME 350. F	
<b>478/678 Machinery Analysis and Design</b>	2
Principles of design, development, and testing of agricultural machines and machine systems. Applications of computer aided design and FMEA. 2 lectures. Prereq: ME 223. S	
<b>479/679 Fluid Power Systems Design</b>	3
See Mechanical Engineering for description.	
<b>482/682 Instrumentation and Measurements</b>	3
Application of instrumentation and sensor concepts to measurement and control of environmental, biological, and mechanical parameters. Includes sensor principles, signal conditioning, data collection, and data analysis methods. 2 lectures, 1 three-hour laboratory. Prereq: ME 223, PHYS 252. S	
<b>486 Design Project I</b>	1
Capstone learning experience involving principles of design, project management, and evaluation. Student teams define a capstone project in their area of interest. 1 lecture/laboratory. Prereq: Senior standing. F	
<b>487 Design Project II</b>	2
Continuation and completion of the capstone learning experience begun in ABEN 486. Communication in oral, written, and graphic forms is emphasized. 2 lectures/laboratories. Prereq: ABEN 486. S	
<b>758 Applied Computer Imaging and Sensing for Biosystems</b>	3
Sensors and non-destructive sensing principles (e.g., computer vision, spectroscopy, imaging, fiber optic sensing) for bioproduction and processing applications. Data/signal acquisition, signal conditioning/analysis techniques, signal interpretation, and pattern recognition using statistical, neural networks, and fuzzy logic techniques.	
<b>763 Theory of Drying Biological Products</b>	3
Theory used to describe the drying processes of biological products. 3 lectures. F	
<b>765 Small Watershed Hydrology and Modeling</b>	3
Study and representation of hydrologic processes on small watersheds. Application of hydrologic models for surface flow, subsurface flow, nutrient and sediment transport, and water quality. Prereq: ABEN 464/664. F	
<b>773 Advanced Agricultural Power and Machinery</b>	3
Theory and design of agricultural power units and field machines. 3 lectures. Prereq: ABEN 473/673. F	
<b>783 Advanced Structures &amp; Environmental Systems</b>	3
Detailed analysis of building components and advanced design problems relating to agricultural and environmental systems. 3 lectures. Prereq: ABEN 383. S	

## AGRICULTURAL ECONOMICS (AGEC)

Lambert, Chair; Aakre, C. DeVuyst, E. DeVuyst, Flaskerud, Gustafson, Hearne, Koo, Leistriz, B. Leitch, Mack, Makee, Nganje, Petry, Rathge, Saxowsky, Swenson, Tweeten, Wachenheim, Wilson

### COURSES

<b>150 Quantitative Economics (CCN)</b>	2
Application of algebra and calculus to price theory. 2 lectures. Prereq: MATH 103 or 107.	
<b>220 World Agricultural Development (CCN)</b>	3
Introduction to theories, policies, and practices to increase food production and agricultural development in developing countries. 2 lectures. Prereq: ECON 201. (ND:SS)	
<b>242 Intro to Agricultural Management (CCN)</b>	4
Economic and managerial concepts related to farm or agribusiness production process, development of cost data, enterprise analysis, organization and management of production inputs. 3 lectures, 1 laboratory.	
<b>244 Agricultural Marketing (CCN)</b>	3
Study of the agricultural marketing system to include cash marketing, commodity futures trading, branded products merchandising and the interrelationship of the government and international trade. 3 lectures.	
<b>246 Introduction to Agricultural Finance I (CCN)</b>	4
Introduction to agricultural finance; provides background in farm and agribusiness credit use and evaluation. Discussion of specific financial conditions on farms and in agribusiness. 3 lectures, 1 laboratory.	
<b>339 Quantitative Methods and Decision Making</b>	3
Application of basic probability concepts to decision analysis, introduction to linear programming models, and decision-tree analysis. 3 lectures. Prereq: ECON 201 and AGECE 150 or MATH 146.	
<b>342 Farm and Agribusiness Management II</b>	3
Application of production economics principles to farm and agribusiness operations. Economic input-output principles and profit maximization. 2 lectures, 1 laboratory. Prereq: AGECE 242.	
<b>344 Agriculture Price Analysis</b>	3
Introduction to price analysis in agricultural markets. 3 lectures. Prereq: AGECE 244.	
<b>346 Applied Risk Analysis</b>	3
Development of tools to analyze business and financial risk problems unique to farms and agribusinesses. 3 lectures. Prereq: STAT 330.	
<b>347 Principles of Real Estate</b>	3
Principles and techniques of real estate appraisals, practical application of appraisal principles, and techniques to real property evaluation. 3 lectures. Prereq: ECON 201. Cross-listed with BUSN.	
<b>350 AgriSales</b>	3
The principles of salesmanship applied to the agricultural business. Topics include attitudes and value systems, basic behavioral patterns, relationship of sales to marketing, selling strategies, preparing for sales calls, making sales presentations, and closing sales. 3 lectures.	



<b>360 International Agribusiness Experience</b> 3	shipping firms. Prereq: AGECE 378 and AGECE 339 or BUSN 352.
Provides students an applied context for analyzing international agribusiness. Students participate in a self- or pre-arranged experience and research an agribusiness topic in depth prior to and while studying in a foreign country.	
<b>374 Cooperatives</b> 3	<b>484 Agricultural Policy</b> 3
Theory, practice, and evaluation of cooperatives including principles, management, marketing, finance, taxes, legal issues, and adjusting to change. 2 lectures. Prereq: ECON 201. Cross-listed with BUSN.	Analysis of the evolution and development of federal food, natural resource, and trade policies and their consequences on the agricultural sector. Exploration of how microeconomic forces influence formulation of macroeconomic agricultural policy. Prereq: ECON 201, Junior standing.
<b>375 Applied Agricultural Law (CCN)</b> 3	<b>701 Research Philosophy</b> 1
Study of laws affecting agriculture and agribusiness including property ownership, financial relations, and environmental regulation. 3 lectures.	Role of the scientist, reasoning, values, and decisions. Problem formulation, literature review, hypothesis development, data collection, analysis, and interpretation. 1 lecture.
<b>378 Introduction to Transportation and Logistics</b> 3	<b>711 Advanced Topics in Econometrics</b> 1-3
Presents the role and importance of transportation, with detailed discussion of the various modes and their specific characteristics. Covers basic logistics concepts in addition to transportation, including inventory, warehousing, and location decisions. Prereq: ECON 201.	Advanced econometric methods appropriate to a variety of research areas in economics and agribusiness will be offered. Analytical methods covered will vary by semester. May be repeated. Prereq: AGECE 710.
<b>420 Integrated Farm and Ranch Management</b> 3	<b>720 Food Safety Costs and Benefits Analysis</b> 3
Intended for persons who will advise or manage farm and ranch operations. Application of all phases of management (including marketing, finance) to crop and livestock production practice. 2 lectures, 1 laboratory. Prereq: AGECE 242, 244, or 246.	See Food Safety for description.
<b>444/644 Crops Marketing</b> 3	<b>725 Food Policy</b> 3
Capstone course for commodity marketing option. Advanced work on topics related to marketing of crops. 2 lectures. Prereq: AGECE 344. Coreq: AGECE 339.	See Food Safety for description.
<b>445 Agribusiness Industrial Strategy</b> 3	<b>739 Analytical Methods for Applied Economics</b> 3
The course integrates industrial organization topics with specific applications to agribusiness strategy problems. Focus is on industry analysis and issues in competition, strategy, and rivalry from an agribusiness perspective. Prereq: AGECE 344. Coreq: AGECE 339.	Study and application of operations research techniques and other decision methods to problems in agriculture, transportation, and resource management. 3 lectures. Prereq: MATH 146.
<b>446/646 Agribusiness Finance</b> 3	<b>741 Advanced Microeconomics</b> 3
Application of financial theory to investment and liability management problems of agribusiness and farm firms. Characteristics, operations, and management of agricultural financial institutions. 3 lectures. Prereq: AGECE 339, 346.	Advanced analysis of demand, production, and costs; pricing output and resource allocation under various market structures. Prereq: ECON 341.
<b>450 National AgriMarketing Association (NAMA) I</b> 1	<b>743 Advanced Macroeconomics</b> 3
Learn the components of an agribusiness marketing plan and apply this knowledge in the development of a marketing plan for a selected product. 1 lecture.	Advanced analysis of macroeconomic theories; economic growth, business fluctuations, and inflation. Prereq: ECON 343, MATH 146.
<b>451 National AgriMarketing Assoc (NAMA) II</b> 2	<b>744 Agribusiness I: Agricultural Product Marketing and Agribusiness Strategy</b> 3
Review the components of an agribusiness marketing plan. Work in teams to prepare written and oral marketing plans for the National NAMA student chapter competition in April. 2 lectures.	Conceptual foundations of agribusiness strategy, food product marketing, and strategic planning are presented. Emphasis is placed on quantitative strategic decision making for the agribusiness firm.
<b>452/652 Food Laws and Regulations</b> 3	<b>746 Agribusiness II: Agrifinance and Commodity Trading</b> 3
See Food Safety for description.	Conceptual foundations of agribusiness finance, trading, and strategy are presented. Emphasis is placed on financial instruments and planning for agribusiness firms and trading and risk management in agricultural commodities.
<b>470/670 Agricultural Trade</b> 2	<b>771 Economics of Transportation Systems</b> 3
Introduction to trade theory and policies and their applications to agricultural product trade. 2 lectures.	The course will provide an understanding of transportation economics and policy issues facing society. Topics include transportation demand, model costs, transportation competition and market power, transportation regulation, transportation investment, and the economics of transportation safety. Cross-listed with CE.
<b>472/672 Advanced Logistical Analysis</b> 3	<b>772 Rural Logistics and Distribution Management</b> 3
Presents major analytical tools and methods used in analyzing logistical strategies. Course emphasis is on application of analytical tools used in quantifying logistical problems by manufacturing, trading, and	Logistical systems and concepts, distribution management, management of railroads and motor carriers, and location of facilities. Includes agribusiness and natural resource case studies. Cross-listed with CE.

## AGRICULTURAL SYSTEMS MANAGEMENT (ASM)

Backer, Interim Chair; Bon, Disrud, Panigrahi, Solseng, Steele, Wiesenborn

### COURSES

<b>115 Fundamentals of Agricultural Systems Management (CCN)</b> 3
Overview of agricultural systems management; engines, machinery, structures, electricity, processing, and conservation. 3 lectures. Coreq: MATH 103, 104, or 107.
<b>125 Fabrication &amp; Construction Technology (CCN)</b> 3
Introduction to materials, methods, and tools used in fabrication, installation, and maintenance of agricultural production and processing facilities. 2 lectures, 1 three-hour laboratory.
<b>225 Computer Applications in Agricultural Systems Management (CCN)</b> 3
Application and use of software for problem solving, reporting, and graphical communication. 3 lectures. Prereq: CSCI 114 or 116, MATH 105, 107, or 146.
<b>259 Measurements in Natural Resource Systems</b> 1
Surveying, data acquisition, area and volume determinations, and other measurement calculation techniques in planning and management of natural resource systems.
<b>264 Natural Resource Management Systems (CCN)</b> 3
General principles of management of natural resource systems including hydrology, soil erosion, irrigation, drainage, and water quality. 2 lectures, 1 three-hour laboratory. Prereq: MATH 103, 104, or 107. Cross-listed with NRM.
<b>323 Post-Harvest Technology</b> 3
Principles and management of crop and feed storage, handling, drying, processing, and crop/feed systems siting, planning, and development. 3 lectures. Prereq: MATH 103, 104, or 107.
<b>354 Electricity and Electronic Applications (CCN)</b> 3
Fundamentals and applications of electricity, power distribution, controls, motors, and solid-state electronics. For non-engineering majors. 2 lectures, 1 three-hour laboratory. Prereq: Junior standing, MATH 103, 104, or 107.
<b>368 Structures and Environment Systems</b> 3
Study of environmental needs of animals and bioproducts, control of building environments, construction materials, framing systems, and functional planning for biosystem structures. 3 lectures. Prereq: MATH 103, 104, or 107.
<b>373 Tractors and Power Units (CCN)</b> 3
Theory and principles of operation, use, maintenance, repair, and selection of tractors and power systems. Includes engines, transmissions, fuel, lubrication, hydraulics, traction, and electrical systems. 3 lectures. Prereq: MATH 103, 104, or 107.
<b>374 Power Units Laboratory (CCN)</b> 1
Laboratory to complement concepts introduced in ASM 373. Topics include engine systems, operation, adjustment, maintenance, repair, measurement, and testing. 1 three-hour laboratory. Prereq: MATH 103, 104, or 107.

**378 Machinery Principles and Management (CCN) 3**

Principles of agricultural machinery manufacture, sales, operation, and management. Topics include selection, replacement, operation, application, and maintenance. 2 lectures, 1 three-hour laboratory. Prereq: MATH 103, 104, or 107.

**429 Hydraulic Power Principles and Applications 3**

Study of fluid power principles, components, schematics, and systems. Emphasis is on proper use, maintenance, and applications of hydraulic power equipment. Prereq: PHYS 211, Junior standing.

**454/654 Principles of Site Specific Agriculture 3**

Principles and practices of site-specific farming, including data acquisition, data management, modeling, equipment management, GPS, and GIS. 2 lectures, 1 three-hour laboratory. Prereq: MATH 103, 104, or 107.

**468 Golf Course Irrigation I 2**

See Plant Sciences for description.

**469 Golf Course Irrigation II 1**

See Plant Sciences for description.

**475/675 Management of Agricultural Systems 2**

Capstone learning experience involving team solution to problems in agricultural systems management. Oral and written communications are emphasized. 2 lectures. Prereq: Senior standing.

**AGRICULTURE (AGRI)**

Dean, Grafton

**COURSES****103 Introduction to Agricultural Communication 3**

An introduction to key issues in agricultural communication. The course focuses on the creation and critical consumption of messages in the context of agriculture. Cross-listed with COMM.

**150 Agriculture Orientation (CCN) 1**

Introduction to opportunities and professional advancement in agricultural careers. Overview of majors offered in the College of Agriculture, Food Systems, & Natural Resources, activities, and support services.

**189 Skills for Academic Success (CCN) 1**

See University Interdisciplinary Studies for description.

**ANIMAL AND RANGE SCIENCES (ARSC)**

Odde, Chair; Barker, Bauer, Berg, Berryhill, Biondini, Caton, Colville, Danielson, Grazul-Bilska, Grygiel, Hammer, Kirby, Lardy, Moore, Park, Redmer, Reynolds, Schroeder, Sedivec, Stoltenow, Vonnahme, Wagner

**COURSES****114 Introduction to Animal Sciences (CCN) 3**

General principles of the livestock industry and relationships to mankind. 2 lectures, 1 two-hour laboratory.

**123 Feeds and Feeding (CCN) 3**

Principles of feeding livestock including digestive systems, nutrient requirements, nutrient characteristics, and sources utilized in the formulation of balanced rations. 2 lectures, 1 two-hour laboratory.

**220 Livestock Production (CCN) 3**

General production and management of major meat and dairy animal species. Topics include production systems, feeding, facilities, health, economics, and marketing. 2 lectures, 1 two-hour laboratory.

**222 Meat Animal Evaluation (CCN) 2**

Relationship between live animal composition and meat product values. Introduction to basic muscle biology and effects of livestock practices on meat quality. 2 two-hour laboratories. F

**225 Natural Resource and Agro-Ecosystems (CCN) 3**

Introduction to scientific theories and their relation to natural resources and agriculture. Influence of these theories on current perspectives toward the environment. 3 lectures. Cross-listed with NRM. (ND:SCI)

**260 Introduction to Equine Studies (CCN) 2**

Introduction to basic aspects of equine studies and general principles surrounding the horse industry. 2 one-hour lectures. F

**260L Equine Care and Management Practicum (CCN) 1**

A laboratory course designed to supplement lecture material covered in ARSC 260. Students will learn management and husbandry skills relevant to modern horse care practices. 1 three-hour laboratory. Coreq: ARSC 260. F

**261 Basic Equitation and Horsemanship 1**

Basic grooming, saddling, bridling, mounting, ground work, correct riding position and proper coordination of the riding aids will be addressed. Horse behavior will also be discussed throughout the course. 1 two-hour laboratory. Lab fee required. Enrollment priority will be given to Equine Studies Major/Minor/Certificate students.

**263 Introduction to Animal Biotechnology 3**

Basic aspects of animal biotechnology, biotechnology in health, biotechnology in reproduction, biotechniques. 3 lectures. Prereq: BIOL 126 or 150. S

**320 Dairy Cattle Selection 1-2**

Visual appraisal, selection, and evaluation of dairy cattle. Type classification of dairy cattle. 2 three-hour laboratories. May be repeated.

**323 Fundamentals of Nutrition 3**

Fundamentals of nutrition emphasizing digestion, metabolism, function, requirements, and sources of specific nutrients. 3 lectures. Prereq: ARSC 123, BIOC 260. S

**326 Modeling of Range and Agro-Ecosystems 3**

Introduction and applications of systems analysis and simulation modeling to agriculture, biology, range ecology, and natural resources management. 2 lectures, 1 two-hour laboratory. (even years)

**330 Meat Selection, Grading, and Judging 1-2**

Evaluation and grading of carcasses and wholesale cuts of beef, pork, and lamb. Written explanation of decisions and comparisons. 2 three-hour laboratories. May be repeated. Prereq: ARSC 222.

**331 Livestock Selection (CCN) 1-2**

Visual and performance evaluation of breeding and slaughter classes of the major meat producing livestock. 2-3 three-hour laboratories. May be repeated. Prereq: ARSC 222.

**336 Introduction to Range Management (CCN) 3**

Principles of range management which include plant identification, range evaluation, and range improvement. 3 lectures. F

**340 Meat Science and Technology 3**

Introduction to meat science. Chemical, physical, and structural properties of meat and meat products. Identification, nutritive analysis, preservation, cooking, and packaging technology. 2 lectures, 1 two-hour laboratory. Prereq: CHEM 260.

**344 Fundamentals of Meat Processing 2**

Chemical and physical relationships in meat preservation, sausage production, and other meat product preparation. 1 lecture, 1 three-hour laboratory.

**357 Animal Genetics 3**

Genetic and statistical principles applied to livestock improvement. 2 lectures, 1 two-hour laboratory. Prereq: PLSC 315, STAT 330. S

**361 Intermediate Horsemanship 1**

A continuation of ARSC 261. Further emphasis will be placed on development of the balanced seat and coordinated aids necessary to complete more advanced maneuvers. 1 two-hour laboratory. Lab fee required. Enrollment priority will be given to Equine Studies Major/Minor/Certificate students. Prereq: ARSC 261.

**363 Equine Nutrition and Physiology 3**

Anatomy and physiology of equine body systems and their application to management of equine nutrition, exercise and conditioning. 3 lectures. Prereq: VETS 135, ARSC 260, 323. S

**365 Equine Evaluation 2**

Detailed study of horse conformation, selection criteria, and judging standards for equine competitions. Emphasis will be placed on development of critical-thinking, decision-making, and oral presentation skills. 2 three-hour laboratories. Prereq: ARSC 260. F, S

**435/635 Nutrition Laboratory Techniques 3**

Theory and basic laboratory techniques associated with nutritional research and current information regarding advanced techniques and developments. 2 lectures, laboratory by arrangement. Prereq: CHEM 260. F (even years)

**450/650 Range Plants 3**

Identification, distribution, and forage value of important U.S. range plants. 1 lecture, 2 two-hour laboratories. Prereq: BOT 314. Cross-listed with BOT. F

**452/652 Geographic Information Systems in Range Survey 3**

Analysis of methods for determining range composition, condition, and productivity. Emphasis will be given to the use of Geographic Information Systems. 3 lectures. Prereq: ARSC 336. F (odd years)

**453/653 Rangeland Resources Watershed Mgmt 3**

Study of the management of physical/biological settings and processes along with human activities on water and watersheds considering preventative and restorative strategies in a rangeland setting. Cross-listed with NRM. S

**456/656 Range Habitat Management 3**

Capstone course to include specific techniques and systems approaches to maintenance and improvement of rangeland ecosystems. 3 lectures. Prereq: ARSC 336. S (odd years)

<b>458/658 Grazing Ecology</b> 3	<b>716 Agrostology</b> 3	<b>ANTHROPOLOGY (ANTH)</b>
Grazing processes and systems and their effects on plants and herbivores. 3 lectures. Prereq: ARSC 336. S (even years)	Identification and description of U.S. grasses and grass-like plants. 2 lectures, 2 two-hour laboratories. Prereq: BOT 314. Cross-listed with BOT. F (even years)	Klenow, Chair: Clark, Gill-Robinson, Kloberdanz, Musiba, Riley, Slobin
<b>460/660 Plant Ecology</b> 3	<b>717 Aquatic Vascular Plants</b> 2	<b>COURSES</b>
See Biological Sciences (Botany) for description.	Identification and description of aquatic vascular plants. 1 lecture, 2 two-hour laboratories. Prereq: BOT 314. Cross-listed with BOT. F (odd years)	<b>111 Introduction to Anthropology (CCN)</b> 3
<b>461 Advanced Horsemanship &amp; Equitation</b> 1	<b>721 Biology of Lactation</b> 2	Introductory overview of the major divisions of anthropology: cultural and physical anthropology, archaeology, and linguistics. (ND:SS)
This course is designed to further the skills obtained in ARSC 361. Riders will be exposed to advanced technical and theoretical knowledge of Western and Hunt seat equitation and horsemanship. More intensive study and development of the skills required for advanced maneuvers will be covered. 1 two-hour laboratory. Lab fee required. Enrollment priority will be given to Equine Studies Major/Minor/Certificate students. Prereq: ARSC 361.	Mammary gland development and mechanisms controlling lactation. 2 lectures. Prereq: BIOC 460.	<b>204 Archaeology and Prehistory</b> 3
<b>463/663 Physiology of Reproduction</b> 4	<b>728 Advanced Reproductive Biology</b> 3	Introduction to archaeological methods, followed by a survey of world prehistory.
Anatomy, physiology, and endocrinology of reproduction in mammals. 3 lectures, 1 two-hour laboratory. Cross-listed with ZOO. S	Discussion of reproductive physiology research with emphasis on current topics in cellular and molecular biology. 3 lectures. Prereq: ARSC 463, BIOC 460. S (odd years)	<b>205 Human Origins</b> 3
<b>464 Reproductive Management Procedures</b> 2	<b>730 Growth Biology</b> 2	Examination of the evolution of humans through the investigation of fundamental principles of evolution, human variation, comparative primate behavior, and the fossil record.
Demonstration and utilization of the new technology in large animal reproductive management including embryo and semen collection, pregnancy diagnosis, and estrous control. 1 lecture, 1 three-hour laboratory. Prereq: ARSC 463. F	Regulation of growth at the cell/tissue, organ systems, and whole animal levels. 2 lectures. Prereq: ARSC 463, BIOC 460. S (even years)	<b>206 Peoples of the World</b> 3
<b>470 Applied Nutrition</b> 4	<b>736 Experimental Nutrition Methods</b> 1	General survey of cultural anthropology and cultures of various regions of the world.
Application of nutrition principles in feed management systems for livestock with emphasis on energy and protein (ruminants) and energy and amino acids (non-ruminants). 4 lectures. Prereq: ARSC 323. S	Design, conductance, analysis, and reporting of experiments taken in conjunction with ARSC 773, 774, 775, or 776. Prereq: ARSC 470, BIOC 460.	<b>208 Folklore and Culture</b> 3
<b>480 Equine Industry and Production Systems</b> 3	<b>740 Data Analyses and Designs of Experiments</b> 3	Examination of folk traditions (oral, customary, and material) within their cultural context.
A capstone course that incorporates genetics, nutrition, exercise physiology, reproduction, health care, and industry practices into management of the equine enterprise. 2 lectures, 1 two-hour laboratory. Prereq: ARSC 363, 463. F	Experimental design principles, introductory statistical theory, and commonly used data analyses of animal and range science data are taught and practiced with practical applications using the computer. 3 lectures. Prereq: STAT 725.	<b>209 Introduction to Linguistics</b> 3
<b>482 Sheep Industry and Production Systems</b> 2	<b>755 Advanced Meat Science</b> 2	See English for description.
Capstone course to include the management, systems, selection, record keeping, merchandising, and production testing of sheep. 3 lectures, 1 two-hour laboratory. Prereq: ARSC 220, 336, 357, 463, 470. Half semester.	Physical, chemical, and structural characteristics of the postmortem meat animal. 2 lectures. Prereq: ARSC 340, BIOC 460. (even years)	<b>432/632 Human Osteology</b> 3
<b>484 Swine Industry and Production Systems</b> 2	<b>765 Analysis of Ecosystems</b> 3	Understanding human evolution requires a good command of structural morphology of the human body. This course offers students the opportunity to examine human (fossil and non-fossil) bones from archaeological sites in a paleoanthropological framework. Prereq: ANTH 111, 204, 205.
Capstone course includes breeding systems, disease control, applied economics, housing, marketing, and nutrition in a systems approach. 3 lectures, 1 two-hour laboratory. Prereq: ARSC 220, 357, 463, 470. Half semester.	Introduction to advanced statistical techniques to evaluate plant communities, plant-animal interactions, and plant-soil relationships. Emphasis on multivariate analysis. 2 lectures, 1 two-hour laboratory. Prereq: STAT 330. S (even years)	<b>433/633 Apes and Human Evolution</b> 3
<b>486 Beef Industry and Production Systems</b> 2	<b>773 Energy Metabolism</b> 3	A laboratory-oriented survey of living primates describing and comparing the diverse behavioral and morphological adaptations of great apes in a human evolutionary context. Prereq: ANTH 111, 204, 205.
Capstone course includes the management, systems, selection, record keeping, merchandizing, and production testing of beef. 3 lectures, 1 two-hour laboratory. Prereq: ARSC 220, 336, 357, 463, 470. Half semester.	Methods of measuring energy values and the metabolic processes involved in the production of useful biological energy from organic compounds. 3 lectures. Prereq: ARSC 470, BIOC 701. F (odd years)	<b>444/644 Peoples of the Pacific Islands</b> 3
<b>488 Dairy Industry and Production Systems</b> 2	<b>774 Nitrogen Metabolism</b> 3	General survey of cultures, past and present, in Melanesia, Polynesia, and Micronesia.
Capstone course includes the management, selection, record keeping, merchandising, and production testing of dairy and dairy products. 2 lectures, 1 two-hour laboratory. Prereq: ARSC 220, 357, 463, 470. Half semester. S	Detailed overview of nitrogenous compounds including metabolism and function. Considerable emphasis on current research from the literature. 3 lectures. Prereq: ARSC 470, BIOC 701. S (even years)	<b>446/646 Current Problems in Paleoanthropology</b> 3
	<b>775 Vitamins and Minerals</b> 3	This course is a critical inquiry and survey of biological anthropology. It allows students to construct our ancestors' past using evidence from paleoanthropology, archeology, geology, ecology, zoology, and comparative primate morphology. Prereq: ANTH 111, 204, 205.
	Metabolism of vitamins and minerals and their application in animal nutrition and the feed industry. 3 lectures. Prereq: ARSC 470, BIOC 701. F (even years)	<b>447/647 Science and Celebrity in Anthropology</b> 3
	<b>776 Digestive Physiology</b> 3	This course explores the field of anthropology and its underlying mechanisms that shaped the theoretical basis of the discipline while allowing us to critically make inquiries of our biocultural existence. Prereq: ANTH 111, 204, 205.
	Investigation of digestive and absorptive events occurring within farm animals. Emphasis on enzyme action, nutrient transport, gut motility, gastro-intestinal endocrinology, and current research. 3 lectures. Prereq: ARSC 470, BIOC 701. F (odd years)	<b>450/650 Cultural Anthropology</b> 3
		Examination of the nature of culture, the dynamics of culture, cultural subsystems, and cultural data collection and analysis. Prereq: ANTH 111.
		<b>452/652 North American Indians</b> 3
		General survey of native North American Indian cultures. Focuses on cultural systems as anthropologists have reconstructed them for the pre-contact period.

<b>453/653 Magic and Religion</b> 3	<b>155 Apparel Construction and Fit</b> 3	<b>263 Construction Methods and Technology</b> 3
Comparative religion, religious concepts, practices, and practitioners. In-depth study of selected religious systems with a focus on shamanic religions. Prereq: ANTH 111. Cross-listed with RELS.	Principles of apparel construction and analysis. Construction of a fitting sloper and two fashion garments. F	Fundamentals of building construction, materials, and methods for residential and commercial construction. Prereq: ADFH 161. Coreq: ADFH 250, 251, 261, 264. F
<b>458/658 Indians of the Plains</b> 3	<b>160 Interior Design Careers</b> 1	<b>264 Residential Systems</b> 2
Ethnographic/ethno-historical survey of major Indian tribes in the Great American Plains region from ancient times to the present.	Survey of the interior design profession and the relationship to allied professionals and organizations. Coreq: Interior Design major, ADFH 150, 151. F	Introduction of basic principles of lighting design and interior systems in residential applications. Prereq: 160, 161. Coreq: ADFH 250, 251, 261, 263. F
<b>461/661 Germans from Russia</b> 3	<b>161 Interior Graphics I</b> 3	<b>271 Visual Merchandising and Promotion</b> 3
Study of the cultural and historical background of an important ethnic group in the Great American Plains region—German-speaking people from Russia.	Fundamentals of technical and graphic communication for interior design documentation. Emphasis on lettering, sketching, and drafting. Prereq: ADFH 150, 151. F, S	Principles, procedures, and sources of information essential for marketing and promoting retail merchandise sales. Experience in planning, executing, and evaluating promotion plans. Prereq: ADFH 150. S
<b>462/662 Cultural Ecology</b> 3	<b>171 Fashion Dynamics</b> 3	<b>272 [172] Product Development</b> 3
Analysis of the systematic relationship between human populations and their ecological surroundings. Prereq: Any ANTH course.	Introductory course tracing the development of fashion and its industry that includes consumer demand and fashion trends and change; the development, production, and marketing of goods from concept to consumer and their interrelationships. F	Examination of issues and management strategies necessary to produce a competitively priced product. Understanding the role of technology in design, production, and marketing/sales of products. Prereq: ADFH 171, 181.
<b>465/665 Web-based Media in Anthropology</b> 3	<b>181 [281] Aesthetic &amp; Visual Analysis of Apparel Products</b> 3	<b>280 Introduction to Facility Management</b> 3
This course focuses on the use of modern computer imaging techniques within an anthropology research context. Topics to be covered include: visual anthropology, cultural preservation, data protection, ethics, web 3-D, digital video, web-design and Internet dissemination.	Analysis of aesthetics and its application to textile and apparel products, environment, and oneself. Prereq: ADFH 150.	Introduction to the fundamental concepts involved in the planning, design, delivery, occupancy, management, financing and disposal of commercial facilities. F
<b>480/680 Development of Anthropological Theory</b> 3	<b>241 Hospitality Accounting</b> 3	<b>300 Design Resource Management</b> 1-3
Focus on major theoretical orientations in anthropology. Emphasis on the ways in which anthropological theories are used to generate explanations for multicultural phenomena. Prereq: ANTH 111.	Basic financial hospitality accounting concepts and practices. Interpretation of accounting and financial control systems in management decision making; uniform system of accounts, departmentalized costing procedures; ratio analysis; budgeting, financial statement analysis, and interpretation. Prereq: ACCT 102, ADFH 140, 141. F	Management of resources used by interior designers, including references, product information, and material samples. May be completed/repeated up to 3 credits. Prereq: ADFH 250, 251.
<b>489 Senior Capstone in Anthropology</b> 1	<b>250 Interior Environmental Analysis</b> 2	<b>310 History of Fashion</b> 3
Synthesis of social research methods, anthropological theory, and sub-discipline content material. Emphasis on integrative skills needed to interrelate the basic concepts of the discipline. Prereq: Senior standing.	Introduction of design theory and process to analyze interior environments. Emphasis on programming and space planning. Prereq: Minimum of 3.00 cumulative GPA, ADFH 160, 161. Coreq: ADFH 251, 261, 263, 264. F	Historic view of the evolution of fashion in the Western world through time as it relates to political/sociological/economic change. F
<b>705 Forensic Anthropology</b> 3	<b>251 Interior Design Studio I: Residential</b> 2	<b>315 History of Interiors I</b> 3
Theory and methods in the recovery, identification, and evaluation of human skeletal remains for criminal investigation purposes.	Application of design theory and process to analyze residential environments. Emphasis on programming, schematics, design development, and construction documentation. Prereq: Minimum of 3.00 cumulative GPA, ADFH 160, 161. Coreq: ADFH 250, 261, 263, 264. F	Survey of historical interiors and furnishings beginning with antiquity through the 1800's. F
	<b>253 Interior Design Studio II: Office Design</b> 2	<b>316 History of Interiors II</b> 3
	Application of design theory and process to analyze office environments. Emphasis on programming, schematics, design development, human factors, and construction documentation of business environments. Prereq: Minimum of 3.00 cumulative GPA, ADFH 250, 251, 261, 263, 264. Coreq: ADFH 254. S	Survey of historical and contemporary interiors and furnishings beginning with the 1800's to the present day. S
	<b>254 Interior Design Studio III: Small Scale Contract2</b>	<b>351 Interior Design Studio IV: Advanced Residential</b> 3
	Application of design theory and process to analyze small commercial environments. Emphasis on programming, schematics, design development, and construction documentation. Prereq: ADFH 250, 251, 261, 263, 264. Coreq: ADFH 253. S	Application of design components to an advanced residential project with emphasis on special populations and design focus. Prereq: Interior Design major. Coreq: ADFH 362, 363. F
	<b>261 Interior Design Graphics II</b> 3	<b>353 Interior Design Studio V: Large Scale Contract Design</b> 3
	Principles and methods of drawing and sketching, including perspective, with an emphasis on a variety of rendering techniques and media. Prereq: Cumulative 3.00 GPA, ADFH 161. Coreq: ADFH 250, 251, 263, 264.	Application of design components to a large scale commercial project with emphasis on systems furniture, interior codes, and building systems. Prereq: ADFH 351, 362, 363, 365, 366, 367. Coreq: ADFH 368, 460. S
<b>APPAREL, DESIGN, FACILITY AND HOSPITALITY MANAGEMENT (ADFH)</b>		<b>355 Flat Pattern Design and Draping</b> 3
Bastow-Shoop, Head; Bates, Braaten, Carlson, Hirani, Hwang, Jha, Kim, Manikowske, Ragan, Ray-Degges, Sunderlin, Williams, Wolfe		Developing original patterns through flat pattern design and draping for individual and commercial applications. Prereq: ADFH 155. S
<b>COURSES</b>		<b>356 Pattern Drafting and Grading</b> 3
<b>140 Introduction to the Hospitality Industry</b> 3		Individual and commercial apparel patterns are created with the pattern drafting method. Grading, a system of making a range of sizes for a master pattern, is examined. Prereq: ADFH 155. S
Overview of the hospitality industry; its history, components, career opportunities, development, and future trends with application to food service, lodging, and travel. 3 lectures. F		
<b>141 Tourism and Travel Management</b> 3		
Application of management principles and techniques to the tourism and resort industry with emphasis on tourism components, recreational activities, and impact of the travel and tourism industry. 3 lectures. S		
<b>150 Design Fundamentals—Lecture</b> 1		
Study of the elements and principles of design. Coreq: Interior Design major or minor, ADFH 151. F, S		
<b>151 Design Fundamentals—Studio</b> 3		
Study and application of elements and principles of design; two- and three-dimensional applications. Prereq: Interior Design major. Coreq: ADFH 150. F, S		

<b>360 Front Office Management</b> 3	<b>384 Beverage Operations</b> 3	<b>452 Comprehensive Interior Design Project</b> 6
Front office procedures; reservations, selling strategies, handling guest inquiries, and night audit functions. Computer application is highlighted. Prereq: ADFH 140, 141. S	Identification and evaluation of beverages served in hospitality establishments with a focus on making quality decisions. Beverages presented will include alcohol (spirits, wines, liqueurs, and beer), coffee, tea, soft drinks, and mineral waters. Prereq: ADFH 140, 141. F	Capstone design studio. Student define problem. Synthesis and implementation of previous course work. S
<b>362 Codes for Interiors</b> 2	<b>385 Global Fashion Economics</b> 3	<b>455/655 Advanced Apparel Assembly</b> 3
Health and safety issues in interior design. Includes codes, regulations, and universal design. Prereq: ADFH 263, 264. Coreq: ADFH 351, 365, 366, 367. F	Study of factors affecting production, distribution, and consumption of products in domestic and foreign textile and apparel industries. Prereq: Junior standing, ECON 105, 201, or 202. F	Application of principles and concepts of advanced apparel assembly to finished products. Prototype development and advanced dressmaking techniques applied to clothing for men, women, and children. Prereq: ADFH 155.
<b>363 Commercial Lighting Design and Building Systems</b> 3	<b>400 Hospitality Cost Control</b> 3	<b>460 Career Development and Professional Practice</b> 3
Integration of theory, techniques, and the art of lighting design with emphasis on commercial applications. Analysis of commercial building systems. Prereq: Interior Design major. Coreq: ADFH 351, 365, 366, 367. F	The use of financial techniques and systems to control food, beverage, and labor costs in hospitality operations. Application of principles related to procurement, production, and inventory controls. Prereq: ADFH 241. S	Overview of professional standards and promotional activities as related to the interior design profession. Coreq: ADFH 353, 368. S
<b>365 CADD for Interiors</b> 3	<b>401 Convention and Meeting Planning</b> 3	<b>467 Hospitality Law</b> 3
Computer-aided design and drafting, emphasizing applications in interior design. Includes drawing creation, editing, layers, blocks, and attributes. Introduction to 3-D. May be repeated. Prereq: ADFH 253. F, S	The roles and responsibilities of professional meeting planners are examined. Planning or hosting a convention or meeting for a corporation, association, or special group. Emphasis on audio/visual equipment, room layout, and special requests. Prereq: ADFH 140 or 141. S	Legal considerations of hospitality property management and exploration of important legislation. Legal rights, liabilities and responsibilities of the operator in conjunction with management policies. Prereq: Senior standing. F
<b>366 Textiles</b> 3	<b>402 Professional Catering Management</b> 3	<b>470/670 Retail Financial Management and Control</b> 4
Fibers, yarns, fabric construction, finishes, and dyestuffs related to selection, use, and maintenance of textile products. Prereq: ADFH 171. Coreq: ADFH 367. F	Study and application of advanced operational managerial principles of food service management for on- or off-premise catering and special events. Prereq: HNES 361, 361L, ADFH 400. F	Study of retail planning, buying, control, and analysis as it relates to decision making using computer simulation packages. Prereq: ADFH 171, CSCI 114 or 116, MATH 104 or 107, BUSN 360 or 362. S
<b>367 Textiles Laboratory</b> 1	<b>403 Resort and Spa Operations</b> 3	<b>479 Hospitality Industry Management Strategies</b> 3
Textile product characterization through the analysis of yarn type, fabric, construction, finishes, and dyestuffs; care procedures; simple identification of fibers, yarns, and fabrics. Prereq: ADFH 171. Coreq: ADFH 366. F	Analysis of the resort concept; history, master planning, environmental impact, facility design, and operational management. Emergence of spa operations and treatments as part of resort amenities. Prereq: ADFH 140 or 141. F	Capstone course for HTM majors. Includes opportunities to analyze hospitality issues, make strategic business decisions, and solve practical problems through case studies and simulations. Prereq: ADFH 241, Senior standing. S
<b>368 Interior Materials and Maintenance</b> 3	<b>404 Restaurant Operations Management</b> 3	<b>480 Facility Design and Management</b> 3
Examine the characteristics, applications, installation procedures, estimating, specifications, and maintenance of materials used in commercial interior spaces. Prereq: ADFH 253, 366, or 367. S	Creative experiences with regional and international foods appropriate for fine dining. Application of management principles in food preparation and service. Emphasis on ethnic foods, cultural foods, and other implications for fine dining management. Prereq: HNES 361, 361L. F, S	Understanding facilities and their components; mastering techniques and procedures for analyzing, planning, designing, constructing, programming, specifying furnishings, and equipping facilities. Prereq: ADFH 253. F (odd years)
<b>370 Sewn-Product Manufacturing and Analysis</b> 3	<b>405 Casino Operations</b> 3	<b>481 Apparel and Textiles Capstone Experience</b> 3
Analysis of the sewn-product manufacturing processes, governmental regulations, sourcing, and technology applications. Focus on evaluating products' quality, performance, and cost. Prereq: ADFH 366 or 367. S	Methods, procedures, and ethical principles utilized in managing a casino operation. Gaming regulations and taxes, mathematics of casino games, casino management, and marketing are addressed. Prereq: Junior standing. F	Critically analyze and propose research-based solutions to problems related to apparel and textiles including production, distribution, and retailing of goods and services. Prereq: Junior standing. S
<b>372 Global Retailing</b> 3	<b>410/610 Dress in World Cultures</b> 3	<b>482 Facility Management Capstone Experience</b> 3
Theoretical approach to management practices and marketing policies for retail soft goods in a complex and changing world market. Prereq: BUSN 360, 362, or ADFH 171. Cross-listed with BUSN.	Analysis of world dress as related to cultural, technological aesthetic, and social patterns. Concepts illustrated through comparative studies of selected world cultures. F, S	Focuses on integrative and problem-solving skills. Key competencies applied in completing a multi-phasic project focusing on benchmarking annual and five-year facility plans that culminate in a professional presentation. Prereq: ADFH 253, 380, Senior standing. S
<b>380 Facility Operations and Analysis</b> 3	<b>411 Food and World Cultures</b> 3	<b>486/686 Dress and Human Behavior</b> 3
Integrative organizational theory applied to financial structures, management procedures, support functions, and operations within a major facility. Prereq: ACCT 102. F (even years)	An integrated approach to the study of foods and cultures. Food influences on demography, habitat, social traditions and settings, social status, religious beliefs, gender, and environmental considerations. History, concepts, and principles of cultures and cuisines. F, S	Influence of dress and appearance on human behavior throughout the life cycle. F
<b>381 Hospitality Marketing and Sales</b> 3	<b>450 Research and Project Development in Interior Design</b> 3	<b>489 Study Tour</b> 1-3
Basic marketing theory and contemporary practice as adapted to the hospitality industry. Emphasis on consumer behavior, market opportunities, marketing research and strategies, and marketing plans. Prereq: ADFH 140, 141, BUSN 360. S	Research, development, and presentation of a programming proposal for a large scale commercial or residential interior. Prereq: ADFH 353, 368, 460. F	Faculty-directed tour to key fashion, design, or business centers in the U.S. and abroad. Visits to off-campus destinations provide students contact with practicing professionals as they are exposed to the fast pace of a changing global industry. May be repeated. Prereq: ADFH 140 or 160, 171.
<b>382 Women in Management</b> 3		<b>710 Consumer Behavior in Merchandising</b> 3
Survey of gender issues in management. Analysis of behaviors and attitudes that affect women in the workforce. S		Evaluation of psychological, sociological, and cultural theories of consumer behavior through the examination of factors influencing the consumer decision-making process.

**720 Professional Advancement** 3  
Analysis of leadership and how it affects organizational culture and change through past and current experiences. Various leadership styles examined and a personal leadership philosophy developed for professional advancement in merchandising.

**730 Product Design, Development, & Evaluation** 3  
Advanced study of issues and management strategies necessary to design and produce a competitively priced product. Examination of the role of globalization and rapidly changing technology on the development of a successful product.

**740 Promotional Strategies in Merchandising** 3  
Examination of integrated marketing communications (i.e., promotional strategies and techniques) while fostering cultural and global awareness, social responsibility and ethical decision making in the field of promotion.

**750 Retail Theory and Current Practice** 3  
Theoretical and applied analysis of merchandising strategies; assessment of internal and external environmental forces impacting strategic decisions by retail firms; synthesis of past and present trends in order to forecast probable future patterns. Prereq: BUSN 362.

**760 History and Contemporary Issues in Trade** 3  
The examination of fiber, textile, and apparel industries in a global context. Historical development of global and U.S. textile and apparel industries and how the economic, political, and social systems affect production and trade. Prereq: ADFH 710, 720, 730, 740, 750.

**770 International Retail Expansion** 3  
Comprehensive understanding of theory, practices, and trends on international merchandise management. An analysis of global retail system and the way goods are distributed to consumers in various countries. Prereq: ADFH 710, 720, 730, 740, 750.

**775 Research Methods in Merchandising** 3  
An overview of the research process used in social science, including an overview and analysis of research methodologies. Also includes a review of current merchandising literature with implications for future research. Prereq: Graduate level statistics course, ADFH 710, 720, 730, 740, 750.

**780 Financial Merchandising Implications** 3  
The advanced study of financial trends in the merchandising industries; implications related to varied organizational structures. Foci will be on the financial implications of recent advances in the field. Prereq: ADFH 710, 720, 730, 740, 750.

**785 Strategic Merchandising Planning** 3  
Examination of the executive planning process utilized to develop successful corporate strategies; emphasis on the importance of a market orientation for building customer value and sustaining a competitive advantage. Prereq: ADFH 710, 720, 730, 740, 750.

## ARCHITECTURE (ARCH)

Gleye, Chair; Aly Ahmed, Barnhouse, Booker, Elnahas, Faulkner, Hatlen, Mahalingam, Martens, Pinkston, Ramsay, Urness, Wischer

## COURSES

**231 Architectural Drawing** 3  
Instruction in traditional (non-digital) representation of architectural designs: elevations, plans, sections,

perspectives. Practice with presentation techniques. Prereq: Admission into second year of architecture or landscape architecture program.

**232 Design Technology** 2  
Introductory exploration of digital design media and environmental technology in architecture and landscape architecture. Prereq: ARCH or LA 271. Cross-listed with LA.

**271 Architectural Design I** 6  
Studio course focused on beginning exercises in basic design, incorporating abstract two-dimensional design, functional response to environmental determinants, the articulation of form, spatial organization, and aesthetic judgment. Prereq: Admission into second year of program.

**272 Architectural Design II** 6  
Studio course focused on continuing exercises in basic design, incorporating abstract two-dimensional design, functional response to environmental determinants, the articulation of form, spatial organization, and aesthetic judgment. Prereq: ARCH 271.

**321 History of Architecture I** 3  
History of architecture from ancient times through the Renaissance with attention placed on the design connections across cultures and across the globe. Lecture course.

**322 History of Architecture II** 3  
History of architecture from the Baroque to the present placing within a global perspective. Lecture course.

**326 Design Theory** 3  
Study of the theoretical, methodological, and ethical elements of architectural design. Prereq: Admission into second year of program.

**344 [341] Architectural Structures I** 3  
Overview of the principles of statics and mechanics of materials and structural concepts relative to building members and frames. Prereq: ARCH 371, MATH 146, PHYS 120.

**351 Materials and Construction** 4  
Study of building materials from source through manufacture, focusing on their contribution to design and the study of the assembly processes of construction. Lecture course. Prereq: ARCH 272.

**354 [452] Architectural Detailing** 3  
Study of wood, steel, masonry, and concrete construction assemblies through architectural detailing, with an introduction to specifications and construction documents. Prereq: ARCH 371.

**371 Architectural Design III** 6  
Studio course providing intermediate level exercises in architectural design; responding to contextual, cultural, environmental, climatic, technological, and aesthetic determinants. Prereq: ARCH 272.

**372 Architectural Design IV** 6  
Studio course continuing intermediate level exercises in architectural design: responding to contextual, cultural, environmental, climatic, technological, and aesthetic determinants. Prereq: ARCH 371.

**443 [342] Architectural Structures II** 3  
Overview of the principles of statics and mechanics of materials and structural concepts relative to building members and frames. Prereq: ARCH 344.

**453 [352] Environmental Control Systems: Passive Principles** 3  
Study of architectural design related to thermal comfort, climate, passive solar systems, daylighting, acoustics, and other environmental concerns. Prereq: ARCH 372.

**454 [451] Environmental Control Systems: Active Systems** 3  
Study of the basic fundamentals of illumination and basic power generation, distribution and service; heating, ventilation, and air-conditioning systems; plumbing systems; and acoustics as they relate to building design. Prereq: ARCH 453, 471.

**461 Urban Design** 2  
Study of urban form and urban theory, development, and processes in a historic and contemporary context. Prereq: Junior standing.

**471, 472 Architectural Design V, VI** 6 each  
Studio courses involving the complex organization of architectural spaces and forms in an urban context. Prereq: ARCH 372, 471 respectively.

**663 [561] Programming and Thesis Preparation** 3  
Discussion and application of a comprehensive design process for production of the design thesis. Emphasis on preparing a design program. Prereq: ARCH 472. Cross-listed with LA 563.

**681 [582] Professional Practice** 3  
Study of contemporary architectural practice covering professional development, firm organization, and project management within the context of the ethical, legal, and regulatory environment. Prereq: ARCH 472. Cross-listed with LA 581.

**721 [521] Non-Western Architectural Traditions** 2  
Advanced course on the investigation of design methods and building traditions of non-Western cultures and diverse geographic regions. May be repeated.

**722 [522] Urbanism** 2  
Advanced course to explore in-depth aspects of urban design. May be repeated.

**723 [523] Historic Preservation** 2  
Advanced course to explore the philosophy and techniques of preserving historic buildings. May be repeated.

**724 [524] Architectural Technology** 2  
Advanced course to explore the historical and theoretical underpinnings of architectural technology. May be repeated.

**725 [525] Architecture of the Recent Past** 2  
Advanced course to explore the major architectural movements and personalities since the mid-20<sup>th</sup> century. May be repeated.

**726 [526] Current Architectural Theory** 2  
Advanced course focused on current issues and the work and design theory of leading architectural practitioners around the world. May be repeated.

**727 [527] Vernacular Architectural Traditions** 2  
Advanced course to explore vernacular architectural traditions in North America and elsewhere. May be repeated.

**728 [528] Socio-Cultural Issues** 2  
Advanced course focused on the social issues and movements that have influenced environmental design.

<b>771 [571 &amp; 572] Advanced Architectural Designs</b> 6	<b>210, 211 Art History I, II (CCN)</b> 3 each	Emphasis on individual concept and content. Prereq: ART 260.
Advanced studio course addressing complex design problems requiring increased self-direction. Prereq: ARCH 472.	Intensive survey of art from Paleolithic to the Renaissance and from the Renaissance to the present. (ND:HUM)	
<b>772 Design Thesis</b> 8	<b>220 Painting II</b> 3	<b>370 Printmaking III</b> 3
Advanced studio course devoted to the execution of a comprehensive design thesis project, from schematic design through design development, presentation, and review. Prereq: ARCH 663, 771.	Intermediate study, studio practice, and critique. Use of oils, acrylics, watercolor, and mixed media. Painting the human figure and development of individual concept and content. Prereq: ART 120.	Advanced study, studio practice, the human figure, and critique. Exploration of mixed-media. Emphasis on individual concept and content. Prereq: ART 270.
<b>789 [589] Professional Topics in Architecture</b> 3	<b>230 Drawing II (CCN)</b> 3	<b>380 Photography III</b> 3
Various topics related to theoretical or methodological aspects of architecture as a professional discipline.	Advanced study and application of different drawing media, methods, techniques and drawing the human figure. Prereq: ART 130.	Advanced study, studio practice, and critique. Professional practice, promotion, and presentation. Emphasis on individual concept and content. Prereq: ART 280.
<b>ART (ART)</b>	<b>250 Ceramics II</b> 3	<b>385 Digital Media III</b> 3
Bromley, Groberg, Kapplinger, Penuel, Swan, Swenson	Intermediate study, studio practice, and critique. Development of individual concept and content. Further exploration of forming skills and surface decoration. Introduction to basic mold techniques, clay and glaze theory, and kiln technology. Prereq: ART 150.	Advanced study, studio practice and critique in digital media. Exploring computer studio potential of 2-, 3-, and 4-dimensional applications. Prereq: ART 285.
<b>COURSES</b>	<b>260 Sculpture II</b> 3	<b>420 Painting IV</b> 3
<b>110 Introduction to the Visual Arts (CCN)</b> 3	Intermediate study, practice, and critique. Further exploration of materials and processes. Development of individual concept and content. Prereq: ART 160.	Advanced study, studio practice and critique in painting. Exploration and development of an individual concept. May be repeated. Prereq: ART 320.
Study and analysis of artistic methods and meaning in the visual arts; designed for non-majors. (ND:HUM)	<b>270 Printmaking II</b> 3	<b>430 Drawing IV</b> 3
<b>111 Introduction to Art History</b> 3	Intermediate study, studio practice, and critique. Extension of process and media. Development of individual concept and content. Prereq: ART 170.	Advanced study, studio practice and critique in drawing. Exploration in individual concept, process and professional preparation. May be repeated. Prereq: ART 330.
Survey of world art from prehistoric to modern times designed for non-majors.	<b>280 Photography II</b> 3	<b>435 Advanced Figure Drawing</b> 3
<b>120 Painting I (CCN)</b> 3	Intermediate study, studio practice, and critique. Use of traditional and alternative black and white and color processes. Emphasis on image gathering strategies. Development of individual concept and content. Prereq: ART 180.	Advanced study, studio practice and critique in figure drawing. Continued exploration of the human form and development of an individual concept. May be repeated. Prereq: ART 335.
Introduction to basic painting through a variety of materials. Includes historical examples, painting the human figure, using acrylics, oils, pastel, and mixed-media.	<b>285 Digital Media II</b> 3	<b>450 Ceramics IV</b> 3
<b>122 Two-Dimensional Design (CCN)</b> 3	Intermediate study, studio practice and critique in digital media. Extension and exploration of computer applications of value to the studio artist. Prereq: ART 185.	Advanced study, studio practice and critique in ceramics. A focus on current issues in ceramics with innovative use of form, process and materials centered in a personal use of content and formal issues. May be repeated. Prereq: ART 350.
Basic study of two-dimensional design for the studio artist.	<b>320 Painting III</b> 3	<b>451 History of American Art</b> 3
<b>124 Three-Dimensional Design (CCN)</b> 3	Advanced study, studio practice, and critique. Exploration of mixed-media. Emphasis on individual concept and content. Prereq: ART 220.	Study of American art from pre-Columbian through contemporary (including Native American), emphasizing its highly individual nature and its effect on world art. Prereq: ART 210, 211.
Basic study of three-dimensional design for the studio artist. (ND:FA)	<b>330 Drawing III</b> 3	<b>452 Contemporary Art</b> 3
<b>130 Drawing I (CCN)</b> 3	Advanced study, studio practice, and critique. Use of mixed-media approaches. Emphasis on individual concept and content. Life drawing emphasis. Prereq: ART 230.	Study of the development of contemporary art examining its cultural and intellectual basis; includes analysis of current art imagery and readings in art theory and criticism.
Study and application of different drawing media, methods, and techniques. Drawing from the human figure required. (ND:FA)	<b>335 Figure Drawing</b> 3	<b>453 Topics in Art History</b> 3
<b>150 Ceramics I (CCN)</b> 3	Exploration of the human form through drawing representationally, abstractly and expressively using a variety of media. Studying historic and contemporary use of the figure will be significant. Prereq: ART 130.	As an upper-division course in a specialized topic in Art History, the subject matter of the course varies by semester, allowing the curriculum to be more responsive and flexible in the subjects it addresses. May be repeated. Prereq: ART 210 or 211.
Introduction to basic ceramic techniques. Includes wheel-throwing and hand-building techniques, surface decoration, glazing, and firing.	<b>350 Ceramics III</b> 3	<b>460 Sculpture IV</b> 3
<b>160 Sculpture I</b> 3	Advanced study and studio practice with individual and group critique. Focus on current issues in ceramics and innovative use of form, process, and materials. Emphasis on individual concept and content. Prereq: ART 250.	Advanced study, studio practice and critique in sculpture. A focus on current issues in sculpture with innovative use of form, process and materials centered in a personal use of content and formal issues. May be repeated. Prereq: ART 360.
Introduction to basic sculpture materials and techniques. Includes exploration of sculptural form in maquettes and large-scale work; additive and subtractive approaches in wood, stone, and mixed media; casting practice in plaster and hydro-stone.	<b>360 Sculpture III</b> 3	<b>470 Printmaking IV</b> 3
<b>170 Printmaking I (CCN)</b> 3	Advanced study, practice, and critique. Use of mixed-media. Specialization in materials and processes.	Advanced study, studio practice and critique in printmaking. Exploration in printmaking of individual concept, process and professional preparation. May be repeated. Prereq: ART 370.
Introduction to basic printmaking techniques and materials. Includes mono-print, collagraph, intaglio, relief, and serigraphy in both traditional and nontoxic methods.		
<b>180 Photography I (CCN)</b> 3		
Introduction to basic photography. Includes visual issues of black and white and color photography. Experience with black and white processing and printing.		
<b>185 Digital Media</b> 3		
Introduction to basic visual arts techniques and applications using computers, tablets, and other digital media.		

**480 Photography IV** 3  
Advanced study, studio practice and critique in photography. Students will expand knowledge of processes while extending their personal exploration. May be repeated. Prereq: ART 380.

**485 Digital Media IV** 3  
Advanced study, studio practice and critique in digital media. Continued exploration of computer studio potential of 2-, 3-, and 4-dimensional applications. Development of an individual concept. May be repeated. Prereq: ART 385.

**489 Baccalaureate Project** 3-6  
Capstone research and creative experience within a specific area of interest with emphasis on refinement of aesthetic applications of techniques and media. May be repeated.

## ATHLETICS (ATHL) COURSES

**111 Activity I** 1  
Basic techniques and practice of fitness activities.

**116 Weight Training** 1  
Basic techniques and practice of weight training.

**118 Fall Semester First-Year Intercollegiate Sports** 1  
First-year participation on an intercollegiate sports team.

**123 Spring Semester First-Year Intercollegiate Sports** 1  
First-year participation on an intercollegiate sports team.

**213 Fall Semester Second-Year Intercollegiate Sports** 1  
Second-year participation on an intercollegiate sports team.

**223 Spring Semester Second-Year Intercollegiate Sports** 1  
Second-year participation on an intercollegiate sports team.

**313 Fall Semester Third-Year Intercollegiate Sports** 1  
Third-year participation on an intercollegiate sports team.

**323 Spring Semester Third-Year Intercollegiate Sports** 1  
Third-year participation on an intercollegiate sports team.

**413 Fall Semester Fourth-Year Intercollegiate Sports** 1  
Fourth-year participation on an intercollegiate sports team.

**423 Spring Semester Fourth-Year Intercollegiate Sports** 1  
Fourth-year participation on an intercollegiate sports team.

**433 Fall Semester Fifth-Year Intercollegiate Sports** 1  
Fifth-year participation on an intercollegiate sports team.

**434 Spring Semester Fifth-Year Intercollegiate Sports** 1  
Fifth-year participation on an intercollegiate sports team.

## BIOCHEMISTRY (BIOC)

Dorsam, Killilea, Sparks, Srivastava

### COURSES

**CHEM 260 Elements of Biochemistry (CCN)** 4  
Protein structure, function conformation, and dynamics; enzymes, DNA-RNA: structure and flow of genetic information; biological membranes; metabolism. 4 lectures. Recommended: CHEM 117 or 122, 140 or 240. Also listed under CHEM.

**460/660 Foundations of Biochemistry and Molecular Biology I** 4  
Rigorous treatment of biomolecules, generation and use of metabolic energy, biosynthesis, metabolic regulation; storage, transmission, and expression of genetic information. 4 lectures, 1 three-hour laboratory. Recommended: CHEM 240 or 342.

**461/661 Foundations of Biochemistry and Molecular Biology II** 4  
Interrelations between metabolic pathways and controls, with emphasis on mammalian systems; biochemistry of specialized tissues, fluids, and hormones; regulation of gene expression in eukaryotes; genetic defects in metabolism. 4 lectures. Recommended: BIOC 460.

**465/665 Principles of Physical Chemistry and Biophysics** 4  
Conceptual approach to physical chemistry and biophysics; molecular structure, energy, equilibria, and kinetics. Application of fundamental concepts and related instrumental techniques to the life sciences. 4 lectures. Recommended prereq: MATH 147, PHYS 212. Recommended coreq: BIOC 460.

**473/673 Methods of Biochemical Research** 3  
Advanced separation, characterization, and enzymological techniques for research in the biological sciences are emphasized. 1 lecture, 2 three-hour laboratories. Recommended: BIOC 461. Recommended coreq for 673: BIOC 701.

**474/674 Methods of Recombinant DNA Technology** 3  
Principles and techniques of recombinant DNA construction, gene cloning, and analysis of gene structure. 1 lecture, 2 three-hour laboratories. Recommended: BIOC 461. Recommended coreq for 674: BIOC 702.

**475/675 Computer Applications in Biochemistry and Molecular Biology** 3  
This course will cover basic and advanced biochemical calculations and the use of computer programs to make these calculations. Programs for the presentation of data and seminars will also be presented. Recommended: BIOC 460.

**483/683 Cellular Signal Transduction Processes and Metabolic Regulation** 3  
Advanced topics in regulation of metabolic processes including signal transduction, reversible and irreversible covalent modification, hormonal effects, protein turnover, and related phenomena. 2 lectures. Recommended for 683: BIOC 702.

**485/685 Industrial Biotechnology** 3  
Discussion of commercial biochemical processes, including industrial fermentation and fermentor design, immobilized cell and enzyme bioreactors, product recovery methods, relevant metabolic pathways, and other aspects of industrial biotechnology. 3 lectures. Recommended: BIOC 460 or 702, MICR 350.

**487 Molecular Biology of Gene Expression** 3  
This is an advanced undergraduate course designed to analyze current information regarding biochemistry and molecular biology of gene expression and regulation in prokaryotes, eukaryotes and archaea, with primary emphasis on eukaryotic systems.

**701, 702 Comprehensive Biochemistry I, II** 4 each  
Comprehensive treatment of the chemistry and biochemistry of proteins, nucleic acids, carbohydrates, lipids, vitamins, hormones, and the specific metabolism of these substances. 4 lectures. Recommended: CHEM 342, BIOC 701 respectively.

**716 Protein and Enzyme Biochemistry** 3  
Advanced topics in protein properties and structure, and the influence of these factors on enzyme kinetics and mechanism. 3 lectures. Recommended: BIOC 702.

**717 Carbohydrate/Lipid Biochemistry** 3  
Advanced topics in the structure, reactions, biosynthesis, and properties of carbohydrate and lipid materials of plant and animal origin. 3 lectures. Recommended: BIOC 702.

**719 Molecular Biology of Gene Expression and Regulation** 3  
Advanced topics in molecular biology and regulation in prokaryotes, eukaryotes, and archaea; early events in developmental gene expression. 3 lectures. Recommended: BIOC 702.

**721 Genomics Techniques** 2  
See Plant Sciences for description.

## BIOLOGICAL SCIENCES (BIOL)

Orte, Department Head; Anderson, Barker, Bleier, Butler, Clambey, Clark, Esslinger, Fawley, Gerst, Grier, Kenyon, Montplaisir, Nuechterlein, Reed, Sheridan, Stockwell

### COURSES

**111, 111L Concepts of Biology, Lab (CCN)** 3, 1  
Introduction to a wide range of biological topics, from the organism, ecology, and evolution to the cell, molecular biology, and genetics. (ND:LABSC)

**124, 124L Environmental Science, Lab (CCN)** 3, 1  
Ecological principles related to human cultures, resource use, and environmental alterations. (ND:SCI)

**126, 126L Human Biology, Lab (CCN)** 3, 1  
Consideration of selected problems in human biology. Cross-listed with ZOO. (ND:SCI)

**150, 150L General Biology I, Lab (CCN)** 3, 1  
Introduction to cellular and molecular biology, genetics, and evolution. (ND:LABSC)

**151, 151L General Biology II, Lab (CCN)** 3, 1  
An introduction to the biology of living organisms and their interactions with each other and their environments. Examples primarily involve plants and animals, but include other groups of organisms as well. (ND:LABSC)

**220, 220L Human Anatomy and Physiology I, Lab (CCN)** 3, 1  
An in-depth introduction to structure and function of human organ systems—cells, tissues, the integumentary system, the skeletal system, joints, muscle and muscular system, nervous tissue and nervous system, and the special senses. F (ND:LABSC)



<b>221, 221L Human Anatomy and Physiology II, Lab (CCN)</b>	<b>3,1</b>	A continuation of BIOL 220, 220L; the endocrine, cardiovascular, lymphatic, immune, respiratory, digestive, urinary, and reproductive systems and development. S	
<b>310L Methods in Cell and Molecular Biology</b>	<b>3</b>	This course exposes students to the most recent experimental methods used to study common organisms used in biological research. Techniques used include gel electrophoresis, chloroplast transformation, genetic analysis, gene sequencing, and basic molecular genetics. Prereq: BIOL 150, 150L.	
<b>315, 315L Genetics, Lab (CCN)</b>	<b>3,1</b>	See Plant Sciences for description.	
<b>364 General Ecology</b>	<b>3</b>	Ecological principles associated with organism environment interactions, populations, communities, and ecosystems. Quantitative approach with examples (animal, plant, microbial) included. Prereq: BIOL 150 or 151. Cross-listed with ZOO.	
<b>440/640 Biotechnology and Ethics</b>	<b>2</b>	Study of ethical issues associated with the development of emerging technologies and their application in solving biological problems. Prereq: BIOL 150 or Junior standing.	
<b>459/659 Evolution</b>	<b>3</b>	Discussion of the mechanisms of evolution, including population genetics, selection, speciation, adaptation, and molecular evolution. Capstone course for Botany and Biological Sciences majors. Prereq: BIOL 315, 364, BIOC 260 or 460.	
<b>705 Teaching College Science</b>	<b>3</b>	This course is designed for graduate students in the sciences who are interested in learning more about science teaching and student learning at the undergraduate level. Cross-listed with EDUC.	
<b>742 Quantitative Biology</b>	<b>3</b>	See Entomology for description.	
<b>750 Advanced Ecology</b>	<b>3</b>	This course covers classical ecological literature and current literature focusing on ecological research philosophy and techniques. An overview/introduction of a variety of statistical methods for analyzing ecological data is covered. Prereq: ZOO 364, STAT 330.	
<b>776 Population Dynamics</b>	<b>4</b>	Principles and mechanics of animal population dynamics. Prereq: BIOL 364 and an interest in working with numbers. S (odd years)	
<b>777 Population Analysis</b>	<b>3</b>	Contemporary maximum likelihood approaches to estimating abundance, survival, reproduction, and dispersal in free-living populations. Goodness-of-fit and information theory applied to population model selection. Examples from a variety of real populations. Prereq: BIOL 776, STAT 660 or 661, ENT 742.	
<b>784 Biological Research Principles</b>	<b>3</b>	Discussion, analysis of published research papers, lectures on selected topics, and student research proposal. Prereq: STAT 725 or 330 and 331.	
<b>785 Photobiology</b>	<b>3</b>	Topics are related to student interests and can include photosynthesis, animal visual systems, light regulated	
		metabolism, pigmentation, photoreceptors, biosensors, photomorphogenesis, and photoperiodic responses. Emphasis will be on recent papers in photobiology. Prereq: BIOC 460.	
<b>Botany (BOT)</b>			
<b>314 Systematic Botany</b>	<b>3</b>	Principles of plant systematics as illustrated by study of variation within and relationship between selected families and orders of vascular plants. Prereq: BIOL 151, 151L.	
<b>315, 315L Genetics, Lab</b>	<b>3,1</b>	See Plant Sciences for description.	
<b>372 Structure and Diversity of Plants and Fungi</b>	<b>4</b>	Comparative survey of diversity in plants (Kingdom Plantae) and fungi (Kingdom Fungi), with emphasis on reproductive and vegetative morphology. Major groups and specific examples discussed in lecture will be given detailed study in the laboratory. Prereq: BIOL 150 or 151.	
<b>380 Plant Physiology</b>	<b>3</b>	Broad coverage of plant growth and metabolism including water relations, mineral nutrition, photobiology, carbon fixation, metabolic processes, stress responses, developmental biology, and growth regulation. Prereq: BIOL 150.	
<b>380L Plant Physiology Lab</b>	<b>1</b>	Optional laboratory course accompanying BOT 380. Molecular, biochemical, and physiological techniques will be used to address contemporary problems in plant physiology. Coreq: BOT 380	
<b>431/631 Intermediate Genetics</b>	<b>3</b>	See Plant Sciences for description.	
<b>450/650 Range Plants</b>	<b>3</b>	See Animal and Range Sciences for description.	
<b>452/652 Plant Structure</b>	<b>3</b>	Study of the development and structure of cells, tissues, and organs of vascular plants. 2 lectures, 1 laboratory. F (even years)	
<b>460/660 Plant Ecology</b>	<b>3</b>	Ecological structure, processes, and patterns observed with plant communities and populations as influenced by environmental conditions. Illustrations provided with local fieldwork. Prereq: BIOL 151, 151L. Cross-listed with ARSC.	
<b>471/671 Phycology</b>	<b>3</b>	Identification, systematics, evolution, ecology, life histories, physiology, cytology, and culture of algae. Prereq: BIOL 151, 151L.	
<b>472/672 Lichenology</b>	<b>3</b>	Biology, ecology, and systematics of lichen fungi. Prereq: BIOL 151, 151L.	
<b>716 Agrostology</b>	<b>3</b>	See Animal and Range Sciences for description.	
<b>717 Aquatic Vascular Plants</b>	<b>2</b>	See Animal and Range Sciences for description.	
<b>720 Advanced Cell Biology</b>	<b>3</b>	In-depth survey of cell biology, including studies of membranes, secretion cytoskeleton, cellular movement organelles, and gene regulation. Prereq: BIOC 702.	
<b>762 Environment and Adaptation</b>	<b>3</b>	Environmental factors and responses evidenced with life-history patterns, genetic variation, population dynamics, species-interactions, and physiological processes. Prereq: BIOL 364.	
<b>764 Ecological Processes</b>	<b>3</b>	Ecosystem dynamics (short-term, successional, evolutionary), component interactions, ecological energetics, and biogeochemical transfers, with consideration of anthropogenic aspects. Historical and theoretical viewpoints included. Prereq: BIOL 364.	
<b>780 Plant Metabolism and Plant Stress Physiology</b>	<b>3</b>	A detailed study of the dynamics, compartmentation, and interactions among metabolic processes in plants and the changes that occur in response to various biotic and abiotic stresses. Prereq: BOT 380 or BIOC 460.	
<b>782 Regulation of Plant Growth</b>	<b>4</b>	Role of hormones, water, and mineral elements in plant growth. Ion and water absorption and translocation. Hormone dynamics. Emphasis on recent molecular studies of hormonal regulation. Prereq: BOT 380, BIOC 460.	
<b>Zoology (ZOO)</b>			
<b>126, 126L Human Biology, Lab</b>	<b>3, 1</b>	See Biological Sciences (Biology) for description. Does not count toward major or minor. (ND:SCI)	
<b>280 Comparative Chordate Morphology</b>	<b>4</b>	Introduction to the systematics, history, and structure of chordates, especially the vertebrates. Prereq: BIOL 151, 151L. S	
<b>315, 315L Genetics, Lab</b>	<b>3,1</b>	See Plant Sciences for description.	
<b>360 Animal Behavior</b>	<b>3</b>	Description of the principal behavior patterns of animals with consideration of ecological, evolutionary, and internal mechanisms. Prereq: BIOL 151, 151L. Cross-listed with PSYC. S	
<b>364 General Ecology</b>	<b>3</b>	See Biological Sciences (Biology) for description.	
<b>370 Cell Biology</b>	<b>3</b>	Structure and function of cells, including cell surfaces, membranes, organelles, cytoskeleton, cell division, cell physiology, and methods used in cell studies. Prereq: BIOL 150, 150L, CHEM 341.	
<b>380 Vertebrate Histology</b>	<b>3</b>	Study of the microscopic anatomy of vertebrate tissues and organs, especially mammals. Prereq: BIOL 151, 151L. S (odd years)	
<b>431/631 Intermediate Genetics</b>	<b>3</b>	See Plant Sciences for description.	
<b>440/640 Microbial Ecology</b>	<b>3</b>	Microbial ecology introduces the student to basic, applied, and current concepts in microbiology and the environment. It considers the roles of microorganisms in maintaining environmental quality and the role of environment in determining microbial diversity. Prereq: ZOO 364.	
<b>450/650 Invertebrate Zoology</b>	<b>4</b>	Survey of the biology, classification, and evolution of invertebrates. Emphasis on major phyla, marine, and parasitic taxa. Prereq: BIOL 151, 151L. S	

<b>452/652 Ichthyology</b> 3	<b>482/682 Developmental Biology</b> 3	<b>351 Foundations of Organizational Behavior</b> 3
Biology and taxonomy of fishes. Prereq: BIOL 151, 151L. F	Analysis of the processes of development, with an emphasis on animal development. Topics range from classical embryology to the cellular and molecular basis of development. Prereq: BIOL 151, 151L. F/2 (even years)	A behavioral approach to management with emphasis on the understanding of individual behavior in groups in organizations. Topics include motivation, communication, perception, and cultural diversity. Prereq: BUSN 350.
<b>454/654 Herpetology</b> 3	<b>720 Advanced Cell Biology</b> 3	<b>352 Operations Management</b> 3
Primarily a field and laboratory course focusing on amphibians and reptiles. Students must make a commitment to participate in at least one of two 4-day field trips plus an independent review project. Prereq: BIOL 151, 151L. F/2 (odd years)	Study of molecular biology of plant and animal cells including molecules, molecular organization, growth and development, nuclear function, cell cycle, and cellular communication. Prereq: BIOC 702.	Study and application of concepts and managerial techniques for manufacturing and service operations. Includes production technology, facility location/layout, inventory management, MRP, just-in-time manufacturing, and total quality management. Prereq: BUSN 350, STAT 330.
<b>456/656 Ornithology</b> 3	<b>750 Advanced Conservation Biology</b> 3	<b>360 Foundations of Marketing</b> 3
Introduction to the biology, classification, and identification of birds, especially local forms. Early morning field trips required. Prereq: BIOL 151, 151L. F	This class will cover recent developments in the field of conservation biology, with a specific focus on recent literature. Areas of focus will include Evolutionary Conservation and Conservation Genetics. Prereq: ZOO 364, 675.	Survey of the four basic areas of marketing: product, price, place, and promotion. Exposure to consumer behavior and strategic marketing from an international perspective.
<b>458/658 Mammalogy</b> 3	<b>760 Evolutionary Ecology</b> 3	<b>362 Foundations of Retailing</b> 3
Biology and taxonomy of mammals. Prereq: BIOL 151, 151L. F	Lecture-discussion course on recent developments in evolutionary theory and their implications in the study of animal adaptation, ecology, and behavior. Prereq: BIOL 364. S/2 (odd years)	Analysis of the global retail environment and exposure to issues such as the development of retailing image, location theory, inventory management, and integrated marketing communication. Prereq: BUSN 360.
<b>460/660 Animal Physiology</b> 3	<b>764 Neuroendocrine and Endocrine Systems</b> 3	<b>372 Global Retailing</b> 3
Study of the physical and chemical principles that govern cell, tissue, organ, organ system, and organismal function. Prereq: BIOL 150, 150L, CHEM 341.	Topics in molecular endocrinology. Emphasis on signal transduction and effects of hormones on gene expression. Prereq: ZOO 464. S/2 (even years)	See Apparel, Design, Facility and Hospitality Management for description.
<b>462/662 Physiological Ecology</b> 3	<b>770 Aquatic Community Ecology</b> 4	<b>374 Cooperatives</b> 3
Comparative physiology of the vertebrates. Study of biochemical, morphological, and behavioral mechanisms involved with compensatory changes in response to changes in ontogeny and/or external environment. Prereq: BIOL 151, 151L.	Nature and ecological roles of the freshwater biota. Discussion of contemporary issues in aquatic ecology. Prereq: ZOO 470. F/2 (even years)	See Agricultural Economics for description.
<b>463/663 Physiology of Reproduction</b> 4	<b>BUSINESS ADMINISTRATION (BUSN)</b>	<b>383 [483] Organizational Communication I</b> 3
See Animal and Range Sciences for description.	Bahrami, Bitzan, Brown, Elder, Froelich, Jones, Jung, Kim, Knoepfle, Macintosh, Rymph, Stevens, Stinson, Szmerekovsky, Traub	See Communication for description.
<b>464/664 Endocrinology</b> 3	<b>COURSES</b>	<b>413 Business Internship</b> 3
Physiology and anatomy of endocrine glands; chemistry and interrelations of their secretions. Prereq: BIOL 151, 151L. F/2 (odd years)	<i>(All courses 300 level and above require a minimum of Junior standing and a 2.50 cumulative GPA.)</i>	Supervised professional experience with an appropriate public or private business. Students must meet standards established by the employer and the College of Business Administration. May be repeated.
<b>470/670 Limnology</b> 4	<b>189 Skills for Academic Success</b> 1	<b>415 Small Business Institute</b> 3
Biological, physical, and chemical features of freshwater ecosystems. Prereq: BIOL 151, 151L, 364, one year chemistry. F/2 (odd years)	See University Interdisciplinary Studies for description.	Practical application of classroom learning in a supervised consulting project with a local business. Teams analyze actual business problems, and develop recommendations for the client.
<b>472/672 Fisheries Biology</b> 3	<b>310 International Business</b> 3	<b>430/630 Legal and Social Environment of Business</b> 3
Principles of ecology and limnology applied to fish production. Prereq: BIOL 364. S/2 (odd years)	Study of international business: ways in which it differs from domestic operations; benefits of operating globally; and political, cultural, and economic problems faced by managers of firms engaged in international activities.	Study of legal and regulatory environment in which business firms operate, as well as the social environment. Includes business ethics and social responsibility issues.
<b>474/674 Fisheries Management</b> 3	<b>318 Taxation in Management Decisions</b> 3	<b>431 Business Law I – Contracts, Property and Torts</b> 3
Techniques used in the study and management of fish. Prereq: ZOO 472. S/2 (even years)	See Accounting for description.	A study of the foundations of business law and commercial transactions: the law of contracts, personal property, real estate, insurance, wills and estates, and torts.
<b>475/675 Conservation Biology</b> 3	<b>340 Principles of Finance</b> 3	<b>432/632 Business Law II – Business Organizations and Commercial Transactions</b> 3
Integrative approach to the study and conservation of biodiversity. Application of principles from various sub-disciplines of the biological and social sciences to current conservation problems. Prereq: ZOO .315, 315L. F	Various concepts and analytical tools in business finance. Includes financial mathematics, valuation, financial analysis and planning, funding sources, capital budgeting, cost of capital, leverage, dividend policy, and working capital management. Prereq: ACCT 200, 201, ECON 201, 202, STAT 330.	A study of advanced topics in business organizations and commercial transactions: the law of sales, commercial paper, agency, business organizations, secured transactions, bankruptcy, securities regulation, and accountants' liability. Prereq: BUSN 431 or 430/630.
<b>476/676 Wildlife Ecology and Management</b> 3	<b>347 Principles of Real Estate</b> 3	<b>435/635 International Business Law</b> 3
Application of ecological principles to management of game and non-game wildlife populations. Field trips required. Prereq: BIOL 364. S	See Agricultural Economics for description.	Study of public and private international law as it relates to international business: international contracts and sales; international business organizations; and international trade, tariffs, and agreements. Prereq: BUSN 430.
<b>477/677 Wildlife and Fisheries Management Techniques</b> 3	<b>350 Foundations of Management</b> 3	
Students will learn traditional and state-of-the-art techniques used in the study and management of fish, wildlife, and other animal populations. Topics will include assessment of population characteristics, habitat, behavioral ecology and genetic structure. Field trips required. Prereq: ZOO 476.	Study of the major functional areas of management including an international perspective of management. Prereq: PSYC 111.	

<b>436/636 Law of Electronic Commerce</b> 3	<b>453 Understanding and Managing Diversity in Organizations</b> 3	of worldwide marketing programs to achieve an organization's objectives including an examination of the progress of the Internet for the marketing of goods and services. Prereq: BUSN 360.
This course will examine the domestic and international legal and regulatory environment of electronic commerce, including the law relating to commercial transactions in cyberspace and liability for those engaged in business on the Internet.	Use of case analysis and experiential learning to consider the theoretical perspectives and practical implications of different forms of diversity at three management levels: personal values and actions; group dynamics; institutional policies and practices. Prereq: BUSN 350.	
<b>441/641 Investment Analysis and Management</b> 3	<b>454/654 International Management</b> 3	<b>466/666 Services Marketing</b> 3
Evaluation of various securities for investment (stocks, bonds), investment analysis (fundamental and technical), concepts of efficient markets, and market risk. Portfolio management and international investment aspects are briefly covered. Prereq: BUSN 340.	Focused on management challenges associated with business activity across national boundaries. Development of management skills for global contexts. Prereq: BUSN 350.	This course focuses on management and strategic issues as they relate to the marketing of services. Prereq: BUSN 360.
<b>442/642 Speculative Markets</b> 3	<b>455/655 Negotiation and Alternative Dispute Resolution</b> 3	<b>467/667 Sports Marketing</b> 3
Evaluation of options, futures, and other derivative securities used for hedging, speculation, and arbitrage. Related market structure, trading strategies, and risks are examined. Prereq: BUSN 340 and any BUSN 400 level course satisfying finance concentration.	An exploration of negotiation and conflict settlement in interpersonal, business, and international settings. Topics include techniques used in negotiations and alternative dispute resolution procedures such as mediation and arbitration. May be repeated. Prereq: BUSN 350.	Focus on effective sports marketing, including an understanding of the sport consumer, the sport product, research, development, and sponsorship and licensing. Areas of sport considered include professional, collegiate, and youth sport, as well as adult and youth recreation and fitness. Prereq: BUSN 360.
<b>443/643 Management of Financial Institutions</b> 3	<b>456 Entrepreneurship/Small Business Mgmt</b> 3	<b>481 Supply Chain Management</b> 3
Development, role, and functions of depository financial institutions. Emphasis on domestic and international regulation, structure, management, and operations of commercial banks. Prereq: BUSN 340.	A comprehensive entrepreneurship/small business course that examines entrepreneurial ideas, processes, individuals; new venture creation and growth (including franchises and family business); and application of management, marketing, and finance tools to the small business context.	Identification of the key elements in a firm's management of their supply chain. Theory and practical applications for analyzing and developing strategies to assist firms in obtaining and maintaining a competitive advantage.
<b>444/644 Money and Capital Markets</b> 3	<b>457/657 Leadership in Organizations</b> 3	<b>486 Senior Thesis</b> 3
Examination of saving-investment decisions, flow of funds, interest rate theories, risk structure, and function of financial markets. Security pricing and portfolio strategies in money, bond, tax exempt, and foreign exchange markets. Prereq: BUSN 340.	This course will give students a comprehensive view of the principles, practices, and challenges of contemporary leadership and followership. Prereq: BUSN 350.	Directed development of a paper showing the application, synthesis, and integration of business concepts.
<b>445/645 International Finance</b> 3	<b>458/658 Labor-Management Relations</b> 3	<b>489 Strategic Management</b> 4
Concerns international financial markets, exchange rates, currency futures, and options. Includes financial aspects of international corporations such as management of corporate assets and liabilities, capital structure, cost of capital, capital budgeting, and international risks. Prereq: BUSN 340.	Analysis of human resource management in the presence of labor unions. Topics include: labor history, labor law, organizing unions, contract negotiations and administration, contract dispute resolution, labor-management cooperation, and strikes. Prereq: BUSN 350.	Integration and application of management, marketing, and finance principles in written and oral case analysis of organizations. Consideration of global, ethical, and current social issues. Capstone for Accounting, Business Administration, and Management Information Systems majors. Prereq: BUSN 340, 350, 360, 430, Senior standing.
<b>446 Corporate Finance</b> 3	<b>460/660 Consumer Behavior</b> 3	<b>740 Advanced Financial Management</b> 3
This course is an extension of BUSN 340 with specific focus on the time value of money, risk and return trade-off, capital structure and firm value, project analysis, dividend policies, and financial case analysis. Prereq: BUSN 340.	Examination of dimensions of consumer buying theories. Aimed at understanding the buying behavior of customers. Prereq: BUSN 360.	In-depth coverage of concepts and decision-making tools in financial analysis, cost of capital, capital structure, capital budgeting, and dividend policy. Emphasis on risk analysis, international perspectives, and current topics in corporate finance. Prereq: BUSN 340.
<b>450/650 Human Resource Management</b> 3	<b>461/661 Advertising and Integrated Marketing Communication</b> 3	<b>750 Advanced Organizational Behavior</b> 3
Survey of human resource management, including job analysis, recruitment, selection, performance appraisal, compensation, training, and labor relations. The impact of environmental influences such as legislation, court decisions, and unions on human resource activities are addressed. Prereq: BUSN 350.	Examination of the use of advertising as part of the worldwide marketing function; prepares the student to analyze and plan integrated marketing communication campaigns. Prereq: BUSN 360.	Study of theory and current management research dealing with individual and small-group behavior in organizations. Topics include motivation, reward, job satisfaction, stress, communication, and conflict resolution. Prereq: BUSN 350.
<b>451 Managerial Economics</b> 4	<b>462/662 Sales and Sales Force Management</b> 3	<b>751 Advanced Operations Management</b> 3
Use of decision science techniques such as statistical and numerical analysis and optimization to study profit, demand and supply, cost and production, market structure, pricing practices, and the impact of government regulations on management decisions. Prereq: BUSN 350, ECON 201, 202, MATH 146.	Examination of different aspects of effective personal selling with focus on decision areas pertaining to sales force management. Prereq: BUSN 360.	Advanced study of concepts and technologies used by service and manufacturing firms with emphasis on process analysis and improvements. Includes demonstration and application of techniques such as simulation, linear/integer programming, and project scheduling. Prereq: STAT 330.
<b>452/652 Compensation Management</b> 3	<b>463/663 Marketing Research</b> 3	<b>760 Strategic Marketing Management</b> 3
Study of the human resource management function of compensation. Topics include the job analysis, job evaluation, wage determination, pay-for-performance, and employee benefits. The impact of compensation on recruitment, satisfaction, and performance is examined. Prereq: BUSN 450/650.	Study of research methods with focus on research design, data collection, and analysis techniques. Prereq: BUSN 360, STAT 331.	Focus on the major decision areas that marketing executives face in their efforts to match the objectives and resources of the organization with the needs and opportunities in the marketplace. Prereq: BUSN 360.
	<b>464/664 International Marketing</b> 3	<b>780 Business Conditions Analysis</b> 3
	Focused on identifying and satisfying global customer needs better than the competition, both domestic and international, and coordinating marketing activities within the context of the global environment. Prereq: BUSN 360.	Preparation of students to analyze domestic and global economic factors that impact the U.S. and world economy. Prereq: BUSN 760.
	<b>465 Marketing Strategy</b> 3	<b>789 Business Policy and Strategy</b> 3
	The analysis, planning, implementation, and control	Process and tools of strategy formulation and implementation in a variety of organizational environments. Prereq: BUSN 740, 750, 751, 760.

## CEREAL AND FOOD SCIENCES (CFS)

Kirby, Interim Chair; Bhattacharya, Chang, Hall, Kahn, Manthey, J. Schwarz, P. Schwarz, Wiesenborn; Adjunct Faculty: Doehrlert, Grant, Hareland

### COURSES

#### 200 Introduction to Food Systems 3

The fundamentals of food science and food safety will be introduced with emphasis on how food components and processing affect quality and safety of foods.

#### 210 Introduction to Food Science and Technology 2

Overview of food components, food quality, nutrition, processing, packaging, safety, sanitation laws, sensory evaluation, distribution, and utilization.

#### 370 Food Processing I 3

This course is designed to provide students with an introduction to food processing methods. The course will provide hands-on experience with a focus on basic food processing methods. Prereq: CFS 210.

#### 430/630 Food Unit Operations 2

Thermodynamics, materials and energy balance, fluid flow, heat transfer, heat exchange, all related to food processing. Prereq: MATH 147, PHYS 211, 211L. Coreq: CFS 431/631.

#### 431/631 Food Unit Operations Laboratory 1

Experiments relevant to 430/630, with emphasis on application of mass and energy balances and heat transfer to food processing operations. Coreq: CFS 430/630.

#### 450/650 Cereal Technology 3

Discussion of cereal grains, their properties, evaluation, and utilization.

#### 452/652 Food Laws and Regulations 3

See Food Safety for description.

#### 453/653 Food and Dairy Microbiology 3

See Microbiology for description.

#### 454/654 Bioprocessing 3

See Microbiology for description.

#### 460/660 Food Chemistry 3

Study of food components including water, carbohydrates, lipids, proteins, vitamins, minerals, and enzymes. Prereq: CFS 210, CHEM 341, 341L.

#### 461/661 Food Chemistry Laboratory 1

Laboratory isolation, observation of characteristics, and quantitation of food components. Coreq: CFS 460/660.

#### 464/664 Food Analysis 3

Principles, applications, and practice of methods for quantitative determination of food components. 2 lectures, 1 three-hour laboratory. Prereq: BIOC 460, CFS 460/660.

#### 470/670 Food Processing II 3

This course is designed to provide students with an in-depth academic and practical exposure to food processing methods and the food industry. Concepts in quality control systems and sanitation will be discussed. Prereq: CFS 370.

#### 471/671 Food Processing Laboratory 1

Field trips, experiments on freezing, freeze-drying, spray drying, canning, beverage production, water

activity measurements, shelf life, and quality control. Coreq: CFS 470/670.

#### 474/674 Sensory Science of Foods 2

The science used in the evaluation of flavor, color, and texture of foods. Experiential approaches will be used to evaluate sensory characteristics of foods. Prereq: CFS 460/660, STAT 330.

#### 480/680 Food Product Development 3

This course is designed to provide students the opportunity to incorporate the basic principles of food science in the theoretical development of food products. (Food Science Capstone). Prereq: CFS 453, 464, 470.

#### 725 Food Policy 3

See Food Safety for description.

#### 752 Advanced Food Microbiology 3

See Food Safety for description.

#### 758 Fundamentals of Flour Testing and Baking 3

Flour testing, industrial, and experimental bread baking. Production methods, ingredients, and baking reactions. Lectures and laboratories. Prereq: CFS 450/650.

#### 759 Milling 3

Experimental and industrial feed and flour milling. Production, equipment, and factors involved in the milling process. Lectures and laboratories. Prereq: CFS 450/650.

#### 760 Pasta Processing 3

Durum wheat quality, pasta production, and pasta quality evaluation. Lectures and laboratories. Prereq: CFS 450/650.

#### 761 Malting and Brewing 3

Barley and malt quality; malting and brewing. Lectures and laboratories. Prereq: CFS 450/650.

#### 764 Cereal Carbohydrates 2

Carbohydrates (monosaccharides, oligosaccharides, and polysaccharides) of cereals with emphasis on barley, wheat, and flour and their importance in industrial products. Prereq: BIOC 701.

#### 765 Advanced Cereal and Food Chemistry I 4

Physiochemical, structural, functional, and analysis of cereal and food carbohydrates and enzymes. Biochemical aspects of these components will also be presented.

#### 766 Advanced Cereal and Food Chemistry II 4

Physiochemical, structural, and functional properties of cereal and food proteins and lipids in food systems.

## CHEMISTRY (CHEM)

Hershberger, Chair; Burghaus, Cook, Jacobson, Page, Rasmussen, Rodgers, Sibi, Sun, Tallman

### COURSES

#### 117, 117L Chemical Concepts and Applications, Lab (CCN) 3,1

Introduction to general and organic chemistry, with applications drawn from the health, environmental, and materials sciences. Recommended coreq: MATH 103 or 107. (ND:LABSC)

#### 121, 121L General Chemistry I, Lab (CCN) 3,1

Matter, measurement, atoms, ions, molecules, reactions, chemical calculations, thermochemistry, bonding, molecular geometry, periodicity, and gases. Recommended coreq: MATH 103 or 107. (ND:LABSC)

#### 122, 122L General Chemistry II, Lab (CCN) 3,1

Intermolecular forces, liquids, solids, kinetics, equilibria, acids and bases, solution chemistry, precipitation, thermodynamics, and electrochemistry. Recommended: CHEM 121, 121L. (ND:LABSC)

#### 140 Organic Chemical Concepts and Applications (CCN) 1

Introduction to organic chemistry for pre-nursing and other students who need to meet the prerequisite for CHEM 260.

#### 150, 160 Principles of Chemistry I, Lab 3,1

Chemistry for students with good high school preparation in mathematics and science. Electronic structure, stoichiometry, molecular geometry, ionic and covalent bonding, energetics of chemical reactions, gases, transition metal chemistry.

#### 151, 161 Principles of Chemistry II, Lab 3,1

Liquids and solids, equilibrium, kinetics, thermodynamics, acids and bases, oxidation-reduction chemistry, electrochemistry. Recommended: CHEM 150, 160.

#### 240 Survey of Organic Chemistry (CCN) 3

Structure and bonding, nomenclature; hydrocarbons: alkanes, alkenes, alkynes, aromatics; substituted hydrocarbons: alkyl halides, stereochemistry, alcohols, phenols, ethers, amines; carbonyls: aldehydes, ketones; carboxylic acids, esters, amides. Recommended: CHEM 121.

#### 260 Elements of Biochemistry (CCN) 4

See Biochemistry for description.

#### 341, 341L Organic Chemistry I, Lab (CCN) 3,1

First semester of a two-semester course in organic chemistry for students in sciences and pre-professional curricula. Recommended: CHEM 122, 122L.

#### 342, 342L Organic Chemistry II, Lab (CCN) 3,1

Structure and reactivity, named reactions, carbon-carbon bond forming reactions, aromatic and heterocyclic chemistry, biomolecules and polymers, and multi-step synthesis. Recommended: CHEM 240 or 341, 341L.

#### 353 Majors' Organic Chemistry Laboratory I 1

Organic functional group synthesis. Modern analytical tools for functional group analysis and structure determination. Recommended coreq: CHEM 341.

#### 354 Majors' Organic Chemistry Laboratory II 2

More advanced aspects of organic laboratory operations, synthesis, analysis, and structure determination using spectroscopic techniques. Recommended coreq: CHEM 342.

#### 364, 365 Physical Chemistry I, II 4 each

Mathematical and physical basis of chemical phenomena. Quantum chemistry and chemical kinetics. Thermodynamics and statistical mechanics. Recommended prereq: CHEM 122 or 151, MATH 265, PHYS 252. Recommended coreq: MATH 266.

#### 380 Chemistry Junior Seminar 1

Includes discussion of chemistry topics, technical writing instruction and assignments; participation in senior seminar discussions.

#### 425/625 Inorganic Chemistry I 3

Electronic structure, ionic and covalent structure and bonding, point groups and symmetry, coordination chemistry, acid-base and redox chemistry. Recommended: CHEM 364.

<b>426/626 Crystallography/Crystal Chemistry</b>	<b>2</b>	electronic spin resonance, Mössbauer spectroscopy and nuclear magnetic resonance methods. Recommended: CHEM 725.	<b>759 Intermediate Physical Chemistry</b>	<b>3</b>	Fundamental principles of physical chemistry including quantum chemistry, spectroscopy, molecular thermodynamics, and kinetics.		
Geometric and space group crystallography. Structure and bonding in common minerals and industrially important solids. Structure-property relationships. Half semester.			<b>760 Statistical Thermodynamics</b>	<b>4</b>	Macroscopic and microscopic models for the study of equilibrium properties of pure phases and solutions. Recommended: CHEM 365.		
<b>427/627 X-Ray Diffraction</b>	<b>2</b>	<b>729 X-Ray Structure Determination</b>	<b>2</b>	Use of single crystal X-ray diffraction data to determine molecular and crystal structures. Recommended: CHEM 626 or 627. Half semester.	<b>761 Optical Spectroscopy</b>	<b>2</b>	Theory and practice of modern spectroscopic methods. Emphasis on visible and ultraviolet wavelength ranges. Recommended: CHEM 632. Half semester.
Analytical X-ray powder diffraction for qualitative and quantitative analysis of crystalline solids. Crystal structure analysis using powder methods. Introduction to X-ray fluorescence spectrometry. Half semester.		<b>730 Separations</b>	<b>2</b>	Theory of equilibrium chemistry in aqueous and nonaqueous systems; principles of chromatographic and other separation techniques. Recommended: CHEM 432/632.	<b>763 Kinetics</b>	<b>2</b>	Experimental methods to determine reaction rates, empirical rate laws, transition state theory. Recommended: CHEM 365. Half semester.
<b>428/628 Geochemistry</b>	<b>3</b>	<b>732 Electrochemistry</b>	<b>4</b>	Theory and application of modern electrochemical methods, including potentiometry, voltammetry, electrochemical impedance spectroscopy, kinetics and mechanisms of electrode processes, corrosion, simulation techniques, and instrumentation. Recommended: CHEM 432/632.	<b>764 Dynamics</b>	<b>2</b>	Chemical physics of energy transfer and reactive collisions. Recommended: CHEM 763. Half semester.
See Geology for description.		<b>734 Instrumentation Electronics</b>	<b>5</b>	Design and operation of digital and analog circuits used in chemical instrumentation, computer interfacing. Includes laboratory. Recommended: CHEM 432/632.	<b>766 Quantum Chemistry I</b>	<b>4</b>	Wave functions and their properties, quantum mechanical behavior of atoms and molecules. Recommended: CHEM 365.
<b>429 Inorganic Chemistry Laboratory</b>	<b>2</b>	<b>736 Mass Spectrometry</b>	<b>2</b>	Theory and application of mass spectrometry in analysis, tandem mass spectrometry, ionization techniques. Recommended: CHEM 432/632. Half semester.	<b>767 Quantum Chemistry II</b>	<b>2</b>	Ab initio and semi-empirical methods for the calculation of energetic and structural properties of molecules; computational methods. Recommended: CHEM 766. Half semester.
Methods of synthesis and characterization of inorganic and organometallic compounds. Capstone laboratory experience for ACS certified chemistry majors. Recommended coreq: CHEM 425.		<b>737 Gas Phase Ion Chemistry</b>	<b>2</b>	Principles and applications of gas phase ion techniques to the study of the chemical and physical properties of reactive intermediates. Recommended: CHEM 736. Half semester.	<b>CHILD DEVELOPMENT AND FAMILY SCIENCE (CDFS)</b>		
<b>431, 431L Analytical Chemistry I, Lab</b>	<b>3,2</b>	<b>741 Physical Organic Chemistry I</b>	<b>4</b>	Principles governing the reactivity of organic compounds and methods for determining reaction mechanisms.	Deal, Head; Bretteli, Brotherson, Duggan, Fitzgerald, Habedank, Hektner, Kaler, Light, McGeorge, Panlaow, Perkins, Randall, Sanders, Stone-Carlson, Werlinger		
Chemical equilibrium and its analytical applications; introduction to chromatography and potentiometry. Recommended: CHEM 122, 122L or 151, 161.		<b>742 Physical Organic Chemistry II</b>	<b>2</b>	Aromaticity, electrophilic substitution, Woodward-Hoffman rules. Recommended: CHEM 741. Half semester.	<b>COURSES</b>		
<b>432/632, 432L/632L Analytical Chemistry II, Lab</b>	<b>3,1</b>	<b>743 Reactive Intermediates</b>	<b>2</b>	Radicals, carbenes, nitrenes, arynes, carbenium ions, survey of other reactive intermediates. Recommended: CHEM 741. Half semester.	<b>135 Family Science</b>	<b>3</b>	Introduction to family science concepts including family life cycle, different styles of family life, and the influence of society on the family.
Theory and application of modern instrumental techniques, including spectroscopy and electrochemistry. Recommended: CHEM 431, 431L.		<b>744 Organic Spectroscopy</b>	<b>2</b>	Structure elucidation by spectrometric methods, including infrared, mass spectrometry, UV, and nuclear magnetic resonance. Interpretation of 2-D NMR spectra. Half semester.	<b>182 Wellness and Aging</b>	<b>3</b>	Study of wellness in the later years with a focus on the positive aspects of aging and the contributions of elders in society including emphases on research, theory, and wellness resources.
<b>435/635 Chemical History</b>	<b>2</b>	<b>745 Organic Synthesis</b>	<b>4</b>	Functional group synthesis, synthetic design, stereochemical control. Recommended: CHEM 741.	<b>186 Consumer and Society</b>	<b>3</b>	Consumer rights, responsibilities, and consequences of consumer decision-making. Overview of advertising, fraud, and other issues.
Survey of the history of the chemical sciences from the stone-age through the early 1900's. Recommended: CHEM 341.		<b>746 Advanced NMR Spectrometry</b>	<b>2</b>	Theory of pulsed FT-NMR, instrumentation, pulse sequences (with emphasis on multipulse experiments), two-dimensional NMR and applications. Recommended: CHEM 744. Half semester.	<b>230 Life Span Development</b>	<b>3</b>	Study of human growth and development throughout the life span.
<b>471 Physical Chemistry Laboratory</b>	<b>2</b>	<b>754 Organic Spectroscopy Laboratory I</b>	<b>1</b>	Laboratory to accompany 744, with emphasis on NMR techniques. Recommended coreq: CHEM 744. Half semester.	<b>242 Couples, Marriages, and Families</b>	<b>3</b>	Study of the formation of relationships in varied contexts: examines the diversity of couples, marriages, and families that exists in our contemporary society. Emphasis will be on relationship health as well as barriers to relationship wellness.
Measurement of thermodynamic and spectroscopic properties of chemical substances, analysis of data. Recommended: CHEM 364.					<b>320 Prenatal, Infant and Toddler Development</b>	<b>3</b>	Study of growth and development of the child from conception to age 3.
<b>476/676 Introduction to Computational Quantum Chemistry</b>	<b>1</b>						
This is a mathematically non-rigorous introduction to procedures and capabilities of basic computational quantum chemistry. Recommended: CHEM 364, 365.							
<b>486/686 Corrosion and Its Control by Coatings</b>	<b>2</b>						
See Coatings and Polymeric Materials for description.							
<b>724 Chemical Applications of Group Theory</b>	<b>1</b>						
See department for description.							
<b>725 Inorganic Chemistry II</b>	<b>3</b>						
Molecular orbital and valence bond theories, inorganic reactions and mechanisms. Recommended: CHEM 425.							
<b>726 Photochemistry and Photophysics</b>	<b>2</b>						
Principles underlying the photophysics and photochemical reactivity of organic, coordination, and organometallic compounds. Introduction to photochemical and photophysical experimental techniques. Recommended: CHEM 625, 724.							
<b>727 Organometallic Chemistry</b>	<b>2</b>						
Synthesis, reactivity, and bonding in organometallic compounds. Recommended: CHEM 725. Half semester.							
<b>728 Physical Methods in Inorganic Chemistry</b>	<b>2</b>						
Physical methodology especially appropriate to the characterization of inorganic and organometallic compounds. Includes electronic, vibrational absorption,							

<b>330 Child Development</b> 3	<b>450/650 Adolescent Development</b> 3	<b>479 Children as Witnesses</b> 2
Study of children, birth through middle childhood. Emphasis on social, cognitive, physical, and emotional development. Recommended: CDFS 230, 320, or PSYC 250.	Study of physical, social, cognitive, and emotional development of adolescents. Includes examination of contemporary issues related to this age group. Prereq: CDFS 230, 320, 330, or PSYC 250.	Critical analyses of issues related to children's testimony in the family and child-care legal arena. Emphasis on developmental perspective of credibility and validity of children's testimony, including cognition, memory, suggestibility, effects of repeated questioning.
<b>341 Parent-Child Relations</b> 3	<b>460/660 Adult Development and Aging</b> 3	<b>480/680 Learning and Cognition in Children</b> 3
Contemporary parenting principles and strategies. Emphasis on application in the home and professional settings. Prereq: CDFS 230 or PSYC 250.	Study of development during adulthood and later life. Emphasis on perceptual-motor and cognitive functioning, personality, adjustment, social, familial, and cultural aspects of adulthood. Prereq: 6 credits social science.	Study of developmental research and theoretical approaches to learning and cognitive development in children from birth through adolescence. Prereq: CDFS 230, 330.
<b>350 Fundamentals of Hospital Child Life</b> 3	<b>462/662 Risk, Resilience, and Competence in Families</b> 3	<b>481/681 Women and Aging</b> 3
Introduction to the child life profession through exploring the needs of hospitalized children. Child development theories will be used to understand coping and intervention techniques for the hospitalized child. Prereq: CDFS 320 or 330.	Study of the key theoretical perspectives and research related to risk, resilience, and competence in families. Includes study of the impact of crisis on family development, risk and protective factors, and positive family development. Prereq: CDFS 135.	Study of theory, research, and application of issues related to women and the aging experience. Prereq: CDFS 460.
<b>353 Children, Families, and Public Policy</b> 3	<b>468/668 Families and Work</b> 3	<b>482/682 Family Dynamics of Aging</b> 3
Interaction of the national economy and the family economy with regard to the public programs affecting well-being of families. Emphasis on philosophies of service delivery and policy alternatives. Prereq: 6 credits social science.	Issues, opportunities and problems related to the interface of work and family. Topics include household division of labor, trends in the labor market, and work-family policy. Prereq: 6 credits social science or CDFS.	Examination of issues related to family life in the later years from the perspectives of the elderly and the family. Prereq: 6 credits social science.
<b>357 Personal and Family Finance</b> 3	<b>471 Program Administration and Professional Relations</b> 3	<b>485 Capstone Experience in CDFS</b> 3
Factors influencing decisions on acquiring and using financial resources and budgeting to achieve goals. Overview of credit, taxation, savings, insurance, and investments. Recommended: CDFS 186.	Overview of policies, strategies, and skills involved in administration of early childhood programs. Includes parent-professional relations. Prereq: CDFS 230, 371, 381. Recommended: CDFS 341.	Integration and application of concepts. Emphasis on theory and research in CDFS, processing and presenting information, and community service. For CDFS majors who will graduate within one year. Prereq: 6 credits social science.
<b>371 Guidance and Curriculum in Preschool Programs</b> 4	<b>472 Family Trauma and Burnout</b> 2	<b>486/686 Children in Social Contexts</b> 3
Examination of philosophies, curriculum models, and guidance techniques in the field of childhood care and education, including sensitivity to cultural diversity. Prereq: CDFS 320, 330.	An overview of primary and secondary systemic family stress as it affects children, spouses, and parents. Emphasis is on family burnout, the mental and physical exhaustion caused by continual and demanding caregiving situations.	Critical examination of research and theory on social relationships established in childhood and adolescence. Special attention given to the development of peer relationships and school contacts and contexts specific to certain children. Prereq: CDFS 330.
<b>381 Creative Activities for Children</b> 3	<b>473 Teens at Risk</b> 2	<b>487 Practicum in Child Development Programs</b> 1-8
Study of developmentally appropriate activities for infants, toddlers, and preschoolers. Prereq: CDFS 320, 330. Coreq: CDFS 382.	An investigation of opposing viewpoints about issues related to factors that put teens and their families at risk, including crime and violence, pregnancy and parenthood, substance abuse, school failure, and the consequences of risk behaviors.	Supervised on- or off-campus experience in early childhood settings. Application of theoretical and practical knowledge as a professional. Prereq: Grade of C or better in CDFS 330, 341, 371, 381, first aid and infant/toddler CPR certification.
<b>382 Implementing Creative Activities for Children</b> 2	<b>474 How Women Changed America</b> 2	<b>488/688 Exceptional Child and Family</b> 3
Supervised implementation and evaluation of developmentally appropriate activities for infants, toddler, and preschoolers. Prereq: CDFS 320, 330. Coreq: CDFS 381.	Investigation of issues since 1970 that significantly affected discrimination against women in society's institutions, racial discrimination among women, and current gender and racial issues as they affect families and children.	Study of children and their families who vary from the norm in development and functioning. Prereq: 6 credits social science.
<b>403 Introduction to Research Methods in Child Development &amp; Family Science</b> 3	<b>475/675 Children and Families Across Cultures</b> 3	<b>701 Graduate Orientation Seminar</b> 1
Undergraduate orientation to research methods in child development and marital/family relationships; students will explore the scientific method as applied to CDFS, methods/issues related to data collection, and methods of data analysis. Prereq: Junior standing.	Study of developmental and family issues as viewed from a cross-cultural diversity perspective.	Introduction to graduate program, faculty, policies and procedures.
<b>424/624 Observation and Assessment of Children</b> 3	<b>476 Child Exploitation and Abuse</b> 2	<b>703 Research Methods in Child Development and Family Science</b> 3
Overview of observation/assessment of children for research and practice application. Prereq: CDFS 320, 330.	Critical analyses of issues related to child exploitation and abuse including causes, legal factors, prevention/intervention/treatment, society's sexualization of children, and internet electronic child pornography.	Introduction to research methods in child development and marital and family relationships. Includes instrument selection/construction, data collection, interpretation of results, and proposal writing. Emphasis on the unique methodological features associated with the field.
<b>425/625 Risk, Resilience and Competence in Children and Adolescents</b> 3	<b>477/677 Financial Counseling</b> 3	<b>722 Applied Research in Gerontology</b> 3
Critical examination of research and theory on elements that place children and adolescents at risk, factors that promote resilience for those who are at risk, and the promotion of competent development for children and adolescents.	Advanced analysis of family financial issues. Evaluation of alternative financial programs. Prereq: 6 credits social science. Recommended: CDFS 357.	Study of research in applied social gerontology. The course will explore quantitative and qualitative approaches to studying older persons and related systems.
<b>448/648 Issues in Sexuality</b> 3	<b>478/678 Financial and Consumer Issues of Aging</b> 3	<b>760 Aging Policy</b> 3
Study of personal, interpersonal, and societal meanings of human sexuality. Decision making relevant to sexual behavior. Prereq: 6 credits social science.	Integration of economic and consumer problems of the elderly including income trends in retirement and health care. Prereq: 6 credits social science.	Formation, implementation and impact of policies that affect the well-being of the elderly in the United States.

<b>761 Applications in Gerontology</b> 3	focuses on working with the gay, lesbian, bisexual, and transgendered community. Coreq: CDFS 794.	<b>212 Civil Engineering Graphic Communications</b> 3	Integrating manual drafting and computer-aided drafting and design in one course with emphases on civil engineering practices. This required course will be taught at sophomore level to get students properly prepared for civil engineering courses. Prereq: CE 111.
Study of the applications of gerontology research and theory. The course will provide an overview of programs, methods and evaluations of services for older adults.		<b>303 Civil Engineering Materials</b> 3	Physical and chemical properties of different types of bituminous materials and Portland cement concrete; industry standards and tests for evaluating raw materials and mix designs. 2 one-hour lectures, 1 three-hour laboratory. Prereq: CE 316 or CM&E 320. F, S
<b>762 Retirement Planning, Employee Benefits and the Family</b> 3	<b>776 Clinical Applications of Couple and Family Therapy II</b> 3		
Critical examination of micro and macro considerations in retirement planning for individuals and families.	This course explores ethical issues related to working with children; assessment of children; child play therapy; family play therapy; child abuse; and grief and loss within the context of sexism, racism, classism, and heterosexism. Coreq: CDFS 794.	<b>309 Fluid Mechanics</b> 3	Statics, kinematics, and dynamics of fluid flow; momentum and energy concepts; flow through pipes; uniform flow in open channels; pumps and measurement of flow. 3 one-hour lectures. Prereq: ME 222. F, S
<b>763 Personal Income Taxation</b> 3	<b>777 Diagnosis and Assessment in Couple and Family Therapy</b> 3		
Study of principles and concepts of personal income tax planning as they relate to families.	This course explores issues related to assessment and diagnosis in the treatment of individuals, couples, and families within the context of sexism, racism, classism, and heterosexism; and practical application of the DSM-IV-TR. Coreq: CDFS 794.	<b>310 Fluid Mechanics Laboratory</b> 1	Visualization and verification of the concepts of fluid flow, pumps, turbines, and flow meters. 1 two-hour laboratory. Prereq: CE 309. F, S
<b>764 Family Economics</b> 3	<b>780 Ethics and Professional Issues in Marital and Family Therapy</b> 3		
Overview of basic concepts and theories in family economics with emphasis on the economics situation of families in the United States.	Study of legal responsibilities, ethical issues, and professional matters as they pertain to the practice of marital and family therapy.	<b>316 Soil Mechanics</b> 3	Principles of soil mechanics including three-phase composition, classification, effective stress, consolidation, shear strength, compaction, and site investigation. 2 lectures, 1 two-hour laboratory. Prereq: ME 223. F, S
<b>765 Insurance Planning for Families</b> 3	<b>781 Family Systems</b> 3		
An in-depth study of risk management concepts, tools, and strategies for individuals and families.	Advanced study of contemporary family systems with emphasis on research, ethics, media, and current family issues.	<b>343 Structural Engineering and Analysis</b> 4	Structural loading and analysis of statically determinate and indeterminate structures. Covers the elastic analysis and deformations of trusses, beams, and frames using force methods, displacement methods, matrix methods, and moment distribution. Prereq: ME 223.
<b>766 Estate Planning for Families</b> 3	<b>782 Advanced Human Development: Birth Through Childhood</b> 3		
Study of principles and concepts of estate planning as they relate to families.	Critical examination of current research and theories on child development. Emphasis on applying theoretical understanding and knowledge of the current empirical research base to current issues facing children and families.	<b>370 Introduction to Environmental Engineering</b> 3	Introduction to various municipal and industrial pollutants being introduced into water, air, and land systems and their effects on the environment. Application of chemical, physical, and biological principles to the management of these pollutants. 3 one-hour lectures. F, S
<b>767 Professional Practices in Family Financial Planning</b> 3	<b>783 Dynamics of Parent-Child Relations</b> 3		
Study of strategies and methods for managing private family financial planning practices including ethics, compensation, client-centered marketing and practice management.	Study of selected theories and research in parent-child relations. Emphasis on interaction between adults and children from infancy to youth. Prereq: CDFS 784, 785.	<b>371 Environmental Engineering Laboratory</b> 1	Water, wastewater, and solid waste analyses regarding their theory, objectives, and practices. Exposure to practical applications of the scientific and design theories presented in CE 370. 1 three-hour laboratory. F, S
<b>768 Housing/Real Estate</b> 3	<b>784 Advanced Human Development: Adolescence Through Adulthood</b> 3		
Overview of the role of housing and real estate in the family financial planning process including taxation, law, mortgages, ethics and financial calculations.	Critical examination of current research and theories on adolescent and adult development. Emphasis on applying theoretical understanding and knowledge of the current empirical research base to current issues facing adolescents, adults, and families.	<b>404 Reinforced Concrete</b> 3	Principles of design and analysis of reinforced concrete members, flexural and shear design of rectangular and tee beams, serviceability criteria, short and slender columns. 2 one-hour lectures, 1 two-hour session. Prereq: CE 343. F, S
<b>769 Financial Planning Case Studies</b> 3	<b>785 Family Theory</b> 3		
Examines professional issues in family financial planning including ethics, regulation on certification, communication, and professional responsibility. Emphasis on personal finance case studies and investment policy.	Identification and analysis of theoretical approaches to research on the family. Study of frameworks currently used.	<b>405/605 Advanced Reinforced Concrete</b> 2	Development and anchorage of reinforcement, details of reinforcement in flexural members, continuous beams and one-way slabs, slender columns, two-way slabs. 1 one-hour lecture, 1 two-hour session. Prereq: CE 404. F, S
<b>770 Fundamentals of Financial Planning</b> 3	<b>CIVIL ENGINEERING (CE)</b>		
Survey of personal/family financial planning including process, time value of money, cash management, credit, taxation, insurance, housing, investments, retirement, and estate planning.	D. Katti, Chair; Andersen, Director; K. Katti, Kellogg, Khan, Lin, Padmanabhan, Varma, Yazdani	<b>408 Water Resources and Supply</b> 3	Hydrologic concepts, development of water supply sources, principles involved in the collection and transportation of water/wastewater/storm runoff, and distribution of water for municipal use. Prereq: CHEM 122, CE 309. F, S
<b>771 Investing for the Family's Future</b> 3	<b>COURSES</b>		
Study of the concepts of time and risk value of money in evaluating investment markets.	<b>111 Introduction to Civil Engineering</b> 2		
<b>773 Foundations of Couple and Family Therapy I</b> 3	Introduction to duty and role of the professional engineer, phases of engineering design activities, computer applications with word processing and spreadsheets. 2 one-hour lectures. S		
This course introduces students to the foundational theories in the field of couple and family therapy. This course also offers a critique of the foundational principles of the field from a critical social justice perspective.	<b>204 Surveying</b> 4		
<b>774 Foundations of Couple and Family Therapy II</b> 3	Measurements and errors; topographical and construction surveys; vertical and horizontal control methods; field exercises and computation techniques for surveying data; computation of earthwork volumes. 2 one-hour lectures, 2 three-hour laboratories. Prereq: MATH 105 or 107. F, S		
Study of theories and interventions that apply to work with couples in therapy. Other topics include sex therapy, domestic violence, issues related to gender, race, and class, and therapy with LGBT couples.			
<b>775 Clinical Applications of Couple and Family Therapy I</b> 3			
This course offers an introduction to socially just approaches to couple and family therapy including narrative and feminist therapies. This course also			

<b>410/610 Water and Wastewater Engineering</b> 3	<b>451/651 Advanced Surveying</b> 2	<b>478/678 Water Quality Management</b> 3
Principles involved in treatment, disposal, reuse, and recycling of municipal water supplies and wastewaters. Laboratory introduces tests to evaluate treatment requirements and effectiveness. 3 one-hour lectures, 1 three-hour laboratory. Prereq: CHEM 122, CE 309. F	Property description and legal land surveys. Astronomical observations to establish position and direction. State plane coordinates. 2 one-hour lectures. Prereq: CE 204.	Physical, chemical, biological, hydrological characteristics, and hydrodynamic elements of receiving waters. Characterizations, measurement, and modeling methods of river/streams, lakes/reservoirs, and groundwater systems. 2 one-hour lectures. Prereq: CE 408, 410. F
<b>411/611 Design of Pre-stressed Concrete</b> 2	<b>454/654 Geometric Highway Design</b> 3	<b>479/679 Advanced Water and Wastewater Treatment</b> 3
Theory and design of pre-stressed concrete structures, pre- and post-tensioning, loss of pre-stress, proportioning of flexural members, deflections. 2 one-hour lectures. Prereq: CE 404. S	Location and design of highways and streets; design controls, elements of design; cross-section and alignment; design of intersections, interchanges, safety appurtenances, and noise barriers. 2 one-hour lectures, 1 two-hour session. Prereq: CE 418. F	Selected problems in the investigation and design of sewerage systems, water distribution systems, wastewater treatment plants, and water purification plants. 2 one-hour lectures. Prereq: CE 408, 410. S
<b>417/617 Slope Stability and Retaining Walls</b> 2	<b>455/655 Airport Planning and Design</b> 2	<b>483 Contracts and Specifications</b> 3
Performance and design of retaining walls, sheet pile walls, braced walls, and reinforced earth. Also evaluation and mitigation of unstable earth slopes. 2 one-hour lectures. Prereq: CE 316. S	System planning and demand forecasting; siting and configuration of airports; aircraft characteristics; air traffic controls; standards for geometric design, pavement design, earthwork, drainage, lighting, and marking. 2 one-hour lectures. Prereq: CE 418. F	Formation, interpretation, and termination of engineering contracts. Engineering specifications and drawings. Other legal matters of concern to engineers. 2 one-hour lectures. Prereq: Senior standing. F, S
<b>418 Transportation Engineering</b> 4	<b>456/656 Railroad Planning and Design</b> 2	<b>486/686 Nanotechnology and Nanomaterials</b> 3
Location, analysis, modeling, and design of multi-modal facilities including highways, railways, airports, terminals, harbors, ports, canals, waterways, pipelines, and conveyor systems. 3 one-hour lectures, 1 two-hour session. Prereq: CE 204.	Rail planning and location analysis, track/rail structure, track layout and control system, locomotives and train resistance, track safety standards and geometrics, terminal design. 2 one-hour lectures. Prereq: CE 418. F	This course covers principles of nanotechnology, nanomaterials and develops a framework for their understanding. The basic tools of nanotechnology: nanoscale characterization, physics and materials design will be discussed in the context of current technological advances. Prereq: Senior standing in Engineering or Sciences. Cross-listed with ME.
<b>419/619 Pavement Design</b> 3	<b>457/657 Pavement Management Systems</b> 2	<b>489 Senior Design</b> 2
Design of flexible and rigid pavements including sub-grade, base courses, surface courses; evaluation criteria including soil, climate, traffic, material, drainage; initial and maintenance cost considerations; construction practices. 2 one-hour lectures, 1 two-hour session. Prereq: CE 316. S	Pavement design, maintenance, and rehabilitation strategies; planning, budgeting, and programming for pavement management at network and project levels; development, design, and maintenance of pavement management systems. 2 one-hour lectures. Prereq: CE 418, 419. F, S	An open-ended capstone design project encompassing a number of the disciplines within civil engineering. 2 one-hour lectures. Prereq: Senior standing. F, S
<b>421/621 Open Channel Flow</b> 3	<b>458/658 Bituminous Materials and Mixtures</b> 3	<b>701 Theory of Elasticity</b> 2
Geometric and hydraulic properties of open channels, momentum and energy principles, design of channels for uniform flow, gradually varied and rapidly varied flow. 2 one-hour lectures. Prereq: CE 309. S	This course presents fundamental knowledge of asphalt material properties, performance requirements, specifications and related test characteristics. Prereq: CE 303.	A theoretical study of linear elasticity, Saint Venant's problems, plain stress, plain strain, strain energy, and torsion. 2 one-hour lectures.
<b>430/630 Timber and Form Design</b> 3	<b>461/661 Foundation Engineering</b> 2	<b>702 Plates and Shells</b> 2
Analysis and design of wood structures and concrete formwork. 2 one-hour lectures, 1 three-hour session. Prereq: ME 223. S	Performance and selection of the following foundations: shallow, mat, combined pile, and drilled piers. 2 one-hour lectures. Prereq: CE 316. F	Theoretical and applied study of the classical theories of plates and shells as they pertain to engineering problems including small displacement of rectangular and circular plates and thin shells. 2 one-hour lectures.
<b>441/641 Finite Element Analysis</b> 2	<b>462/662 Designing with Geosynthetics</b> 2	<b>706 Plastic Design in Structural Steel</b> 2
Weak and strong solutions to governing differential equations in bars, boundary conditions, Galerkin approximation, nodal basis functions, shape functions. Two-dimensional problems with triangular and quadrilateral elements. 2 two-hour lectures. F, S	Theories, principles, and engineering design using geosynthetic materials for a variety of civil engineering applications. Applications to geotechnical, environmental, transportation, and water resources fields are emphasized. Includes construction issues. Prereq: CE 316. S	Inelastic bending of beams and frames, application of upper and lower bound theorems, calculation of deflection, effect of axial and shearing forces on flexural strength, connections, structural safety, and rules of plastic design. 2 one-hour lectures.
<b>442/642 Matrix Analysis of Structures</b> 2	<b>472/672 Solid Waste Management</b> 3	<b>709 Dynamics of Structures and Foundations</b> 2
Review of matrix algebra, flexibility and stiffness methods, direct stiffness method, introduction to finite element analysis. 2 lectures. Prereq: CE 343. F, S	Basic study of solid waste materials, current collection methods, available disposal techniques, recycling and resource conservation, and economics of solid waste collection and disposal. 3 one-hour lectures. Prereq: CE 370, 408. F, S	Advanced topics in structural dynamics, frequency domain response, generalized coordinates, nonlinear structural response, dynamic analysis of framed structures, structures with distributed properties, seismic design considerations. 2 one-hour lectures. Prereq: CE 446.
<b>444 Structural Steel Design</b> 3	<b>473/673 Air Pollution</b> 3	<b>714 Theory of Elastic Stability</b> 2
Design of metal structures including mechanical behavior of metals; behavior and proportioning of tension and compression members; beams, beam columns, and connections; selection of metal structural systems. 2 one-hour lectures, 1 two-hour session. Prereq: CE 343.	Fundamentals of air pollution and its control technology. Types and sources of air pollutants, meteorology, effects on plants, animals, people, and property. Design of control equipment. 3 one-hour lectures, 1 three-hour laboratory. Prereq: CE 370. S	Bending of beams under simultaneous action of axial and lateral loads, buckling of compressed bars in both the elastic and plastic ranges, design formulas, lateral buckling of beams. 2 one-hour lectures.
<b>445/645 Advanced Steel Design</b> 2	<b>477/677 Applied Hydrology</b> 3	<b>720 Continuum Mechanics</b> 3
Analysis and design of metal structures including connections, selection of structural systems. 1 one-hour lecture, 1 two-hour session. Prereq: CE 444. S	Scope of hydrology, probabilistic concepts in water resources, regional frequency analysis, application of risk concepts to hydrologic design, hydrologic data generation for ungaged watersheds, hydrologic modeling. 2 one-hour lectures. Prereq: CE 408. F	Tensor analysis in affined and metric spaces, kinematics of motion, general principles of continuum mechanics, thermodynamics of deformation, and postulates on constitutive laws. 3 one-hour lectures. Cross-listed with ME. F
<b>446/646 Basic Dynamics of Structures</b> 3		
Analysis of single degree of freedom structural systems to harmonic and general dynamic loading, free vibration of multiple degree of freedom systems, modal superposition, earthquake engineering. 3 one-hour lectures. Prereq: CE 343. F		



**725 Biomaterials-Materials in Biomedical Engineering** 3

This course covers the fundamentals of synthesis, properties, and biocompatibility of metallic, ceramic, polymeric and composite materials that are designed for replacement of biological materials such as hard and soft tissues.

**762 Advanced Foundation Engineering** 2

Advanced topics in performance and design of foundations. Current topics include a two-dimensional finite element analysis of the foundation and its supporting soil. 2 one-hour lectures. Prereq: CE 461/661.

**768 Advanced Water and Wastewater Laboratory** 3

Studies on selected processes, efficiency and evaluation of water and wastewater treatment. Selected methods of water and wastewater analyses. 2 one-hour lectures, 1 three-hour laboratory. Prereq: CE 371.

**770 Hazardous Waste Site Remediation** 3

Hazardous waste site remediation, hazardous treatment technologies. 3 one-hour lectures. Prereq: CE 370, 408. F

**771 Economics of Transportation Systems** 3

See Agricultural Economics for description.

**772 Rural Logistics and Distribution Management** 3

See Agricultural Economics for description.

**775 Industrial Waste Management** 3

Regulations and standards on industrial pollution control, industrial waste characteristics, industrial waste management strategies, and waste treatment methods. Prereq: CE 610.

**776 Groundwater and Seepage** 3

Groundwater as a resource, relation to hydrologic cycle, well hydraulics, seepage, ground water quality and contamination, ground water flow models. 2 one-hour lectures. Prereq: CE 408. S

**778 Transportation Administration** 3

Public organization behavior and administration, fund accounting, public budgeting, financial management, and strategic management of transportation agencies. Includes transportation case studies.

**780 Transportation Planning** 3

Development and trends in travel demand forecasting; trip generation, trip distribution, mode choice, traffic assignment; transportation plans for modal, multimodal, and paratransit alternatives; policy formulation and analysis. 3 one-hour lectures. Prereq: CE 418.

**781 Traffic Engineering** 3

Traffic characteristics, studies, and control devices; operations analysis and design; aspects of signing, signalization, markings, and lighting; accident analysis; traffic laws and ordinances; work zone safety practices. 2 one-hour lectures, 1 two-hour laboratory. Prereq: CE 418. S

**782 Public Infrastructure Management and Construction** 3

Management and construction of public infrastructure including streets, highways, and sidewalks; public transportation; street lighting and traffic control systems; potable water; wastewater and drainage; parks, recreation facilities, solid waste handling and disposal, and others. Prereq: CE 619, 656. Cross-listed with CM&E.

**CLASSICAL LANGUAGES (CLAS)**

Andreini, Nichipor

**COURSES****101, 102 First-Year Latin I, II (CCN)** 4 each

Introduction to forms, syntax, and vocabulary of classical Latin. 101: (ND:HUM)

**151, 152 First-Year Greek I, II (CCN)** 4 each

Introduction to forms, syntax, and vocabulary of Attic Greek along with selected readings. 151: (ND:HUM)

**180 Scientific Terminology: Greek and Latin (CCN)** 2

Brief survey of prefixes, suffixes, and roots from Greek and Latin, which form the technical vocabulary for science and medicine.

**201, 202 Second-Year Latin I, II (CCN)** 3 each

Designed to form a transition from introductory material to the Latin authors. Prereq: CLAS 102, 201 respectively.

**251 Second-Year Greek I (CCN)** 3

Introduction to Koine Greek as found in the New Testament. Prereq: CLAS 152.

**252 Second-Year Greek II (CNN)** 3

Readings from selected classical Attic Greek authors. Prereq: CLAS 251.

**289, 290 Biblical Hebrew I, II (CCN)** 3 each

Fundamentals of Hebrew script, grammar, and syntax. Includes selected readings from Biblical prose.

**350 Glory of Greece** 3

History of the ancient Greeks, their literature, politics, customs, art, and architecture.

**360 Grandeur of Rome** 3

History of ancient Rome, its literature, politics, customs, art, and architecture.

**361 Cicero** 3

Study of the life and times of Cicero through selections from his letters, speeches, and philosophical essays. Prereq: CLAS 202.

**362 Virgil** 3

Study of the poetry of Virgil with a concentration on the Aeneid. Prereq: CLAS 202.

**363 Advanced Latin Prose** 3

Readings from Roman historians and other writers of Latin prose. Prereq: CLAS 202.

**364 Advanced Latin Poetry** 3

Readings from Catullus, Horace, Ovid, and other Latin poets. Prereq: CLAS 202.

**370 Classical Mythology** 3

Study of the gods and heroes of the Greeks and Romans as found in classical and modern literature, sculpture, and painting.

**451 Advanced Greek Prose** 3

Readings from Classical Greek philosophers, historians, and orators in the original. Prereq: CLAS 252.

**452 Greek Tragedy** 3

Appreciation of Greek drama through reading selections from Aeschylus, Sophocles, and Euripides in the original. Prereq: CLAS 252.

**CLINICAL LABORATORY SCIENCE (CLS)**

P. Olson

**COURSES****111 Introduction to Clinical Laboratory Science (CCN)** 1

Introduction to clinical laboratory science. Lectures, discussions, and field trips focus on professional traits and communication, ethical behavior of the health care provider, major curriculum requirements, and scope of practice.

**435 [BIOL] Hematology** 2

An introduction to the origin, maturation, and function of the formed elements of human blood. Identification of normal cells will be emphasized. Prereq: MICR 202L or 350L.

**COATINGS AND POLYMERIC MATERIALS (CPM)**

Bierwagen, Chair; Croll, Gelling, Webster; Adjunct Faculty: Chisholm, Gebhard, Hill, Provder, Roesler, Skerry

**COURSES****472/672 Environment and Chemical Industries** 2

Environmental issues as they pertain to chemical industries, including regulations, bioremediation, safety, disposal of materials, and design of environmentally compliant chemicals and chemical processes. Prereq: CHEM 341.

**473/673 Polymers Synthesis** 3

Catalysts and mechanisms in the chain-growth and step-growth synthesis of macromolecules from polyesters of the 30's to current engineering polymers. Prereq: CHEM 342.

**474/674 Coatings I** 3

Principles of film formation, synthesis, structure property relationships, coating solvents; pigments and their dispersion. Prereq: CHEM 342.

**475/675 Coatings II** 3

Physical properties of coatings and their components; formulation, design, testing, and applications; color, adhesion, and rheology. Prereq: CPM 474/674.

**484/684 Coatings I Laboratory** 2

Polymer synthesis, coating characterization, and properties. Laboratory counterpart to CPM 474. Coreq: CPM 474/674.

**485/685 Coatings II Laboratory** 2

Coating formulation; testing, color measurements, synthesis, application methods. Laboratory counterpart to CPM 475. 1 six-hour laboratory. Hours flexible. Prereq: CPM 484/684. Coreq: CPM 475/675.

**486/686 Corrosion and Its Control by Coatings** 2

Corrosion science: electrochemistry of corrosion, corrosion effects, measurement of corrosion, corrosion control by coatings, characterization of coating protection, accelerated testing. Coreq: CHEM 432, CPM 474/674, 475/675. Cross-listed with CHEM.

**771 Modern Methods of Polymer Characterization** 3

Modern spectroscopic (FT-IR, solid state NMR, light scattering, and others) and physical (dynamic mechanical analysis, chromatographic and thermal analysis) methods for characterization of polymers and coatings. Prereq: CHEM 365.

<b>773 Organic Chemistry of Coatings</b> 3	<b>150 Forensic Practice (CCN)</b> 1	<b>313 Editorial Processes</b> 3
Organic reactions involved in film formation and degradation. Prereq: CHEM 741.	Applied speaking experiences in competitive and non-competitive settings. Speaking experiences in public address, oral interpretation, reader's theatre settings, and competitive debate offered. May be repeated.	Principles of print media copy-editing, headline composition, publication design, photo editing, and computer editing. Prereq: COMM 200.
<b>775 Color and Appearance</b> 3	<b>200 Introduction to Media Writing (CCN)</b> 3	<b>315 Small Group Communication</b> 3
Topics in color and appearance in coatings and weathering of coatings, including photochemical principles. Prereq: CPM 675.	Introduction to writing in the styles and forms required in journalism, advertising, broadcasting, and public relations. Mass communication majors must earn a grade of B or better. Prereq: COMM 112, ENGL 120.	Focus on group processes, methods of problem solving, parliamentary procedures, and relational components of group interaction.
<b>777 Water-Soluble Polymers</b> 2	<b>212 Interpersonal Communication (CCN)</b> 3	<b>318 [314] Argumentation &amp; Advocacy</b> 3
Structure of water and its influence on aqueous solution behavior of polymers. Synthetic, carbohydrate, protein, and other bioengineered water-soluble polymers. Prereq: CPM 473/673.	Theory and practice of communication in interpersonal relationships. Includes aspects of self-expression and relationship communication. Speech communication majors must earn a grade of B or better.	Theory and process of argumentation with practical experience in preparation and delivery of formal and informal arguments. Prereq: COMM 110.
<b>778 Physical Chemistry of Polymers</b> 4	<b>214 Persuasive Speaking (CCN)</b> 3	<b>320 Communication Analysis</b> 3
Introduction to rheological concepts and the flow behavior of macromolecules. Transitions in polymers, molecular weight characterization, blend compatibility, composite behavior, and other topics, e.g., drug release and liquid crystals. Prereq: CPM 673.	Elements of persuasive speaking with focus on evaluating information directed at the consumer. Includes strategies of altering attitudes, beliefs, values, and behavior. Prereq: COMM 110.	Overview and application of basic methods used in communication analysis. Mass Communication and Speech Communication majors must earn a grade of B or better.
<b>782 Physical Chemistry of Coatings</b> 3	<b>216 Intercultural Communication (CCN)</b> 3	<b>321 [411] Introduction to Communication Theory</b> 3
Surface chemistry diffusion in coatings, colloid stability, advanced CPVC concepts, film formation, particle size effects, and theories of coating application methods. Prereq: CHEM 365. Coreq: CPM 474/674.	Exploration of the definition, models, and verbal processes of communication between different cultural groups. (ND:SS)	Major theoretical approaches to the study of communication from social scientific and humanistic traditions.
<b>785 Nanomaterials Chemistry</b> 3	<b>242 Advanced News Photography (CCN)</b> 3	<b>325 Applied Research Methods</b> 4
This 3-credit course is to teach graduate students the chemical synthesis, characterization and applications of nanomaterials.	Exploration of photography in all phases of news. Introduction to techniques of photojournalism, including composition, lighting, and computerized editing of news photos. Prereq: COMM 200.	See Political Science for description.
<b>COMMUNICATION (COMM)</b>	<b>260 Principles of Internet Web-Based Design</b> 3	<b>340, 341 Social Research Methods, Laboratory</b> 3,1
P. Nelson, Chair; Burnett, Collins, Littlefield, Meister, O'Connor, Okigbo, Pearson, D. Sellnow, T. Sellnow	This course aims to orient students to Web concepts, design, presentation, and evaluation. Prereq: CSCI 114 or 116.	See Sociology for description.
<b>COURSES</b>	<b>261 Introduction to Web Development</b> 3	<b>345 Principles of Broadcast Production</b> 3
<b>103 Introduction to Agricultural Communication</b> 3	Introduces the tools used by Web Development professionals, including HTML, Web editors, imaging software, Javascript, and Acrobat pdf format. Prereq: CSCI 114 or 116.	Creation, critique, and analysis of audio production and single camera video productions with special emphasis on radio and television news. Prereq: COMM 310.
See Agriculture for description.	<b>271 Listening and Nonverbal Communication (CCN)</b> 3	<b>362 Principles of Design for Print</b> 3
<b>109 Communicating with Confidence</b> 1	Theory and practice of effective listening; nonverbal aspects of human communication.	Applications of various design principles and pagination techniques to cognitive problem solving involved in developing material for publication.
Designed for students who are reluctant to enroll in speech due to high speech anxiety. Focused on discussing causes of speech anxiety and practicing anxiety-reducing techniques. Does not satisfy any requirements for graduation.	<b>301 [401/601] Rhetorical Traditions</b> 3	<b>370 Principles of Public Relations</b> 3
<b>110 Fundamentals of Public Speaking (CCN)</b> 3	Historical/descriptive examination of rhetorical theory from the classical through modern periods.	Public relations as a professional field; theory, principles, and practices used in solving public relations problems. Prereq: COMM 200.
Theory and practice of public speaking with emphasis on content, organization, language, delivery, and critical evaluation of messages. (ND:COMM)	<b>308 Business and Professional Speaking</b> 3	<b>375 Principles and Practices of Advertising</b> 3
<b>111 Honors Public Speaking</b> 3	Oral and written communication skills for professional and business settings. Includes resume, cover letter and memo writing; interpersonal and group applications; and interviewing and professional presentations emphasis. Prereq: COMM 110.	Advertising as a professional field; theory, principles, and practices used in advertising campaigns.
Accelerated theory and practice of public speaking with emphasis on content, organization, language, delivery, and critical evaluation of messages. Equivalent to COMM 110. Prereq: GPA of 3.5.	<b>310 Advanced Media Writing</b> 3	<b>376 Advertising Creative Strategies</b> 3
<b>112 Understanding Media and Social Change (CCN)</b> 3	Construction of professional quality messages for print, public relations, and broadcast. Prereq: B or better in COMM 200.	Introduces students to creative ideas in advertising and their translation into words and images. Emphasis is on strategic approaches to creative decision-making across all media. Prereq: COMM 375.
Exploration of the purpose, function, and impact of media on society. Mass communication majors must earn a grade of B or better. (ND:SS)	<b>312 Oral Performance Studies</b> 3	<b>377 Advertising Media Planning</b> 3
<b>114 Human Communication</b> 3	Study and practice of the principles involved in oral performance. Includes the development of vocal qualities and articulation, as well as the analysis of literary texts representing a variety of genres and formats of interpretation. Prereq: COMM 110.	This course introduces students to the basic concepts of media planning and buying in advertising. Emphasis is placed on strategic approaches to the media placement process across all forms of media. Prereq: COMM 375.
Overview of communication theory with emphasis on information transmission and social influence functions of communication behavior in personal and mediated contexts. Speech communication majors must earn a grade of B or better.		<b>380 Health Communication I</b> 3
		This course is designed to introduce students to the field of health communication. Students will learn about models of health communication, doctor-patient communication, designing and implementing health campaigns, and organizational communication in health organizations.

<b>381 Patient-Provider Communication</b> 3	<b>445 Advanced Broadcast Production</b> 3	<b>487 Organizational Power and Leadership</b> 3
This course is designed to provide verbal and nonverbal strategies to improve patient-provider interaction during the medical visit and subsequent sessions involving the diagnosis and treatment of health-related conditions. Prereq: B or better in COMM 112, 114, 212.	Development of skills in the creation, critique, and analysis of television productions in the studio and in the field. Prereq: COMM 345.	This course emphasizes communicative dimensions of organizational leadership. Theory will be discussed as a foundation for leadership practices. Prereq: COMM 383.
<b>383 [483] Organizational Communication I</b> 3	<b>450/650 Issues in Communication</b> 3	<b>489 Communication Capstone</b> 3
Exploration of the theory of management communication practices in organizations. Emphasis on the formal structure and interpersonal aspects of supervisor-subordinate relations. Prereq: Junior standing. Cross-listed with BUSN.	Development of skills in the creation, critique, and analysis of television productions in the studio and in the field. Prereq: COMM 345. May be repeated.	This course is designed to integrate and assess the student's knowledge of the major through the development of a project.
<b>402/602 Contemporary Rhetoric</b> 3	<b>451/651 Directing Forensics</b> 2	<b>700 Research Methods in Communication</b> 3
Examination of the use of public address in the contemporary culture to identify styles of usage and ethical practices employed by communicators. Prereq: Junior standing.	Theory and practical strategies for coaching individual speaking events and debate at the high school or collegiate levels. Prereq: Junior standing.	Introduction to research planning and design, methods of research, and presentation of research results. Masters and Doctoral students have different sections.
<b>412/612 Gender and Communication</b> 3	<b>462 Web Database Programming</b> 3	<b>701 Action Research in Communication</b> 3
Exploration of philosophical and theoretical issues surrounding gender construction, communication, and culture. Focus on ways in which communication in families, schools, media, and other institutions create and sustain gender roles.	Introduces students to Web database concepts, design, normalization processes, and implementation. Prereq: COMM 260, 261.	Introduction to Action-Orientated Research for doctoral students in communication. Concepts such as engaged learning, problem-based learning, and social justice will be explored. The course includes both the theory and practice of action research. Prereq: COMM 700.
<b>421/621 History of Journalism</b> 3	<b>472/672 Public Relations Campaigns</b> 3	<b>702 Introduction to College Teaching in the Humanities and Social Sciences</b> 3
The history and development of journalism as shaped by the political and social environment. Prereq: COMM 310.	Social science research as applied to public relations, case study analysis, construction, and implementation of public relations campaigns. Prereq: COMM 370.	See Humanities for description.
<b>425 Specialty Writing</b> 3	<b>473 Case Study in Public Relations</b> 3	<b>705 Advanced Communication Theory</b> 3
Methods and practice of writing features and opinion for print publications. Prereq: COMM 310.	Advanced study of applied public relations theory through intense case study analysis and research focused on organizations. Case studies from the Public Relations Society of America are used. Prereq: COMM 472.	Provides doctoral students with a structured forum for discussion of communication theory and research. Prereq: COMM 711.
<b>431 Communication Ethics</b> 3	<b>474 Communication Campaigns</b> 3	<b>706 Advanced Interpersonal Communication</b> 3
Study of ethical theories and their role in conceptions of mass media responsibility. Capstone course.	This course builds on the experience of other social science courses, and provides a foundation for purposive uses of communication to achieve pre-determined informational, attitudinal, and/or behavioral objectives.	Interpersonal communication theory and research methods are developed from the perspectives of uncertainty reduction, conflict management, relationship reciprocity, constructivism, compliance gaining, discourse dominance, and relational dynamics.
<b>433/633 Legal Communication</b> 3	<b>476 Advertising Campaign Practicum</b> 3	<b>708 Advanced Qualitative Methods in Communication Research</b> 3
Verbal and nonverbal factors in the legal interview, negotiation and conflict resolution, jury selection, opening statements, witness examination, closing arguments, and jury deliberation. Designed for students interested in applied communication theory or pre-law.	This course challenges students to apply the knowledge they have gained in previous advertising classes. Specifically, students will design an advertising campaign including market research, creative execution, media planning, and account management. Prereq: COMM 376, 377.	In-depth application of one of the methods used in qualitative communication research. Prereq: SOC 700.
<b>434/634 Communication Law</b> 3	<b>480 Health Communication II</b> 3	<b>710 Advanced Quantitative Methods in Communication Research</b> 3
Exploration of speech and press protections of the First Amendment; includes libel, privacy, electronic media regulation, and speech regulation.	Designed to introduce students to advanced theory and research in health communication. Course topics include interpersonal health communication, intervention design, and global perspectives on health communication. Prereq: COMM 380	Application of quantitative methods to communication research, with an emphasis on testing theoretically driven hypotheses, operationalizing variables, designing valid and reliable measures, implementing a research design, analyzing data, and reporting findings. Prereq: SOC 701, STAT 725.
<b>435/635 Popular Culture and Mass Media</b> 3	<b>482 Organizational Communication II</b> 3	<b>711 [611] Communication Theory</b> 3
Analysis of popular culture messages (television, cinema, music, and radio) presented by the media as an expression of social values.	Examination of the structure and function of interpersonal communication networks in formal organizations, methods of network analysis. Prereq: COMM 383.	Major theoretical approaches to the study of communication from social scientific and humanistic traditions.
<b>436/636 Issues in Mass Communication</b> 3	<b>484 Global Organizational Communication</b> 3	<b>715 Theories of Small Group Communication</b> 3
Studies of mass communication topics in interaction with social, cultural, political, and economic realities. Media impact on national life and thought. May be repeated. Prereq: Junior standing.	Globalization and its impacts on organizations is examined. This course delves into the organizational dynamics of globalization by examining the three major types of organizations (economic, social, and government) and their global dynamics Prereq: COMM 383.	Survey of theoretical constructs of communication in the small group setting. Examination of current methods of research.
<b>442/642 Information Technologies &amp; Mass Media</b> 3	<b>485 Crisis Communication in Public Relations</b> 3	<b>721 Intercultural Communication</b> 3
Focuses on the impact of globalization on media, business, non-profit and governmental organizations. Prereq: Junior standing.	Crisis communication practices in organizations of all types with emphasis on planning, emergency communication, image restoration, and organizational learning. Prereq: COMM 110. Cross-listed with SAFE.	Advanced theories of verbal and nonverbal behavior, attitudes, and communication styles that affect interaction between cultural groups.
<b>443/643 Mass Media and Public Opinion</b> 3		<b>725 Communication and Change</b> 3
Overview of theories and methodologies used in the study of the role of mass media in attitude formation, attitude change, and public opinion. Prereq: Junior standing.		Investigation of the diffusion process and related variables affecting an innovation's rate of adoption.

<b>731 Communication Ethics Seminar</b> 3	<b>116 Business Use of Computers (CCN)</b> 4	<b>227, 228 Computing Fundamentals I, II</b> 3 each
Study of ethical theories and their relationship to the mass media.	Exploration of how microcomputers are used in business. Use of word processing, spreadsheet, database, graphing, and telecommunication applications. Credit awarded only for CSCI 114 or 116, not both. (ND:COMPSC)	Two-semester sequence focused on problem solving and writing computer programs in a modern high-level programming language in a state-of-the-art programming environment. Second semester includes an introduction to the object-oriented programming paradigm. Prereq: MATH 103 or 107, CSCI 227 respectively.
<b>750 Advanced Issues in Communications</b> 3	<b>122 Beginning BASIC/Visual BASIC (CCN)</b> 3	<b>235 Theoretical Computer Science I</b> 3
Advanced theory and philosophy of research issues in the field of communication. May be repeated.	Introduction to programming in the BASIC/Visual BASIC language. (ND:COMPSC)	Models of computation, regular expressions, finite automata, Kleene's Theorem, lexical analysis, context-free grammars, pushdown automata, introduction to parsing. Prereq: CSCI 161.
<b>752 Theory of Argument</b> 3	<b>125 Beginning COBOL (CCN)</b> 3	<b>236 Theoretical Computer Science II</b> 3
Philosophy and theory of argumentation; including exploration of analytical methods employed in argumentation.	Introduction to programming in the COBOL language. (ND:COMPSC)	Parsing techniques, context-free languages, Turing machines, recursive and recursively enumerable languages, unrestricted grammars, unsolvable decision problems, computability, introduction to computational complexity. Prereq: CSCI 235.
<b>755 Rhetoric of Environmental Science</b> 3	<b>126 Beginning FORTRAN (CCN)</b> 3	<b>275 Digital Systems I</b> 3
This course focuses on the communication (rhetoric) of science and how disciplinary conventions and ideological commitments shape the language of environmental science in understanding "external realities."	Introduction to programming in the FORTRAN language. Prereq: MATH 103 or 107.	See Electrical and Computer Engineering for description.
<b>761 [601] Survey of Rhetorical Theory</b> 3	<b>155 Immigration (CCN)</b> 2	<b>277 Introduction to UNIX</b> 3
Historical-descriptive examination of rhetorical theory from the classical through modern periods.	Introduction to programming in the current language of CSCI 160. For transfer students with CSCI 160 or equivalent, in a language different from that used here. Prereq: CSCI 160.	This course introduces students to the UNIX operating system environment. Topics include basic UNIX commands, operating system installation and administration, application installation, use of alternative shells, web servers, and system security. Cross-listed with MIS.
<b>767 Rhetorical Criticism</b> 3	<b>159 Computer Science Problem Solving</b> 2-3	<b>315 System Analysis and Design</b> 3
Survey of critical methods of inquiry that may be applied to oral discourse and frameworks for critically evaluating communication processes and products.	Computer-based problem solving techniques are introduced in the context of the Internet, including web-site development. Programming concepts, data structures and algorithms, as well as modeling techniques are discussed. (ND:COMPSC)	Introduction to the front end of the software development life cycle. Includes various modern concepts, techniques, and tools for analyzing and designing well-structured software systems. Prereq: CSCI 160.
<b>780 [680] Health Communication</b> 3	<b>160 Computer Science I (CCN)</b> 4	<b>316 System Testing and Maintenance</b> 3
Advanced theories and principles of communication in the health professions.	Introduction to computer science including problem solving, algorithm development, and structured programming in a high-level language. Emphasis on design, coding, testing, and documentation of programs using accepted standards of style.	Introduction to the back end of the software development life cycle. Includes various modern concepts, techniques, and tools for testing and maintaining software systems. Prereq: CSCI 315.
<b>782 Theories of Persuasion</b> 3	<b>161 Computer Science II (CCN)</b> 4	<b>345 Topics on Personal Computers</b> 3
Survey of the theories related to persuasion, attitudes, and values of societal groups, and the assessment of attitudes and values held by the public.	Advanced concepts in computer science including data structures, algorithm analysis, standard problems such as searching and sorting and memory management issues. Prereq: CSCI 160.	Exploration of some aspects of personal computers not covered in other courses, varies each time it is offered. May be repeated. Prereq: CSCI 161.
<b>783 [683] Advanced Organizational Communication I</b> 3	<b>162 Intense FORTRAN (CCN)</b> 2	<b>366 Files for Database Systems</b> 3
Exploration of the theory of management communication practices in organizations. Emphasis on the formal structure of and interpersonal aspects of supervisor-subordinate relations.	Intensive introduction to FORTRAN and its use in engineering applications. Students receive an introduction to numerical analysis, particularly error analysis. Prereq: MATH 103 or 107.	File organization techniques, design, and implementation of database systems. Prereq: CSCI 374.
<b>784 Advanced Organizational Communication II</b> 3	<b>172 Intermediate BASIC/Visual BASIC</b> 3	<b>371 Web Scripting Languages</b> 3
Study of the structure and function of communication interaction in formal organizations and survey of methods of analysis including the communication audit. Also includes models of introducing innovations.	Elements of Visual Basic for those with previous programming background. Topics include fundamental constructs, Active X controls, file processing, database management, and SQL. Prereq: one semester/experience in any programming language.	This course examines Scripting Languages and their applications. Emphasis will be placed on web scripting. A representative set of scripting languages will be covered. Prereq: CSCI 122. Cross-listed with MIS.
<b>785 Advanced Crisis Communication in Public Relations</b> 3	<b>212 Self-Paced C++</b> 1	<b>372 Comparative Programming Languages</b> 3
Long- and short-term issues for managing communication related to organizational crises are discussed in the stages of pre-crisis, crisis and post-crisis. Cross-listed with SAFE.	Introduction to the C++ programming language. Students complete exercises and programming assignments at their own pace. Prereq: Programming skill in another language.	Explanation of the concept and impact of a block-structured language. Several languages will be compared with respect to application, suitability, syntax, and semantics. Prereq: CSCI 161 or 228.
<b>786 Risk Communication</b> 3	<b>214 Self-Paced C</b> 1	<b>373 Assembly Programming</b> 3
See Food Safety for description.	Introduction to the C programming language. Students complete exercises and programming assignments at their own pace. Prereq: CSCI 160.	Machine language, assembly language, and related hardware concepts, assembly language programming, macros and subroutines, system facilities and macros. Prereq: CSCI 160. Cross-listed with ECE.
<b>COMPUTER SCIENCE (CSCI)</b>	<b>222 Discrete Mathematics</b> 3	
Magel, Chair; Andersen, Denton, Fu, Juell, Kamel, Li, Martin, Nygard, Perrizo, Salah, Slator, Ubhaya, Wu, Xu	Sets, functions, relations, logic, methods of proof, mathematical induction, combinatorics, recurrence relations, generating functions. Prereq: CSCI 160.	
<b>COURSES</b>		
<b>114 Microcomputer Packages (CCN)</b> 3		
General introduction to computer concepts, operating systems, the internet, word processing, spreadsheets, database management and presentation software. Credit awarded only for CSCI 114 or 116, not both. (ND:COMPSC)		

<b>374 Computer Organization and Architecture</b> 3	<b>460/660 Dynamic Programming</b> 3	<b>708 Foundations of Programming</b> 3
Organization and structure of the major sections of a computer: CPU, memory, and I/O system organization and implementation issues. Prereq: CSCI 373. Cross-listed with ECE.	Basic principles and algorithms of dynamic programming as applied to sequential decision problems in CS and OR. Prereq: MATH 166.	Introduction to formalisms, in which computer programs are considered as mathematical objects, including weakest precondition and predicate calculus. Prereq: CSCI 236.
<b>413/613 Principles of Software Engineering</b> 3	<b>467/667 Algorithm Analysis</b> 3	<b>713 Software Development Processes</b> 3
An introduction to concepts of software engineering. Software development activities through a project. Lifecycle models, requirements, specification, design, implementation, and testing. Software quality, tools, and techniques. A term paper for graduate students. Prereq: CSCI 161.	Design, correctness, and analysis of algorithms and data structures. Prereq: MATH 166, CSCI 161, 222.	This course is designed as a breadth course on the software engineering process. Basic concepts are reviewed and reassured to create a basis for higher concepts and techniques.
<b>418/618 Simulation Models</b> 3	<b>468/668 Database Systems Design</b> 3	<b>714 Software Project Planning and Estimation</b> 3
Fundamental techniques involved in using a computer to simulate business, social, and industrial systems. Includes principles of random variate generation, statistical sampling, and design of experiments. Prereq: STAT 367.	Overview of the maintenance and manipulation of databases. Includes a large project in C++. Prereq: CSCI 366.	This course is designed to introduce the student to concepts and techniques of how to plan for a software project. This includes time and effort estimation, planning and teaming the project, and managing the development activities. Prereq: CSCI 713.
<b>426/626 Introduction to Artificial Intelligence</b> 3	<b>469/669 Network Security</b> 3	<b>715 Software Requirements Definition and Analysis</b> 3
Introduction to artificial intelligence for undergraduates. Includes basic AI concepts and techniques. Prereq: CSCI 372.	Cryptography and its application to network and operating system security; authentication; email, web, IP, and wireless security; firewalls and intrusion detection techniques; security threats and countermeasures; legal and ethical issues. Prereq: CSCI 222, 459/659, C/C++ or JAVA.	This course is designed to make the student able to identify and capture requirements for a software system and be able to document and assess the requirements. Prereq: CSCI 713.
<b>436/636 Intelligent Agents</b> 3	<b>474 Operating Systems Concepts</b> 3	<b>716 Software Design</b> 3
Fundamentals of Intelligent Agents technology, agent communication languages, applications, and intelligent agents development. Prereq: CSCI 372.	How operating systems manage the resources of a computer. Topics include processes, concurrency, scheduling, deadlocks, memory allocation, virtual and secondary storage. Prereq: CSCI 374.	This course covers both architectural design and module design. Students receive practice using a set of patterns to produce software designs with several different types of architecture. Substantial presentation and practice with the UML modeling language is provided. Prereq: CSCI 713.
<b>445 Software Projects Capstone</b> 3	<b>475/675 Operating Systems Design</b> 3	<b>717 Software Construction</b> 3
Presentations on the mechanics of working cooperatively as a team doing commercial software development. Students work in teams to deliver realistic work products to local businesses. Course presentations cover teamwork, software development pragmatics, and software documentation. Coreq: CSCI 489.	Advanced operating systems topics such as protection, errors, and distributed systems. Case studies of representative operating systems. Students work in small teams to implement their own basic operating systems. Prereq: CSCI 474.	This course covers the fundamentals of software construction including programming and evaluation of the source code. Students receive a good grounding in and extensive practice with the comprehensive libraries associated with a modern programming language. Prereq: CSCI 713.
<b>448/648 Digital Image Processing</b> 3	<b>476/676 Computer Forensics</b> 3	<b>718 Software Testing and Debugging</b> 3
Introduction to fundamental principles and techniques of digital image processing: image enhancement, image compression, and image analysis. Emphasis on hands-on experience in using software development packages and implementation of various image processing algorithms. Prereq: CSCI 372, MATH 166.	This course introduces principles, techniques, tools, and practical skills necessary to perform rudimentary investigations of incidents in which computers play a significant or interesting role. Prereq: CSCI 474.	This course covers the goals, practices, evaluation and limitations of software testing and software debugging. Students receive practice in developing and using test plans and various testing and debugging techniques. Prereq: CSCI 713.
<b>453/653 Linear Programming and Network Flows</b> 3	<b>477/677 Object-Oriented Systems</b> 3	<b>722 Compiler Construction</b> 3
Linear programming models and applications, primal and dual formulations, computational procedures; introduction to networks, maximum flow, and shortest path problems. Prereq: MATH 265.	Introduction to the concepts and advantages of object-oriented computer systems. Introduces exercises with at least one such language. Prereq: CSCI 372.	Design and structure of complex grammars, lexical analysis, parsers, semantic data structures, and code generating and optimization. Construction of a simple compiler. Prereq: CSCI 372.
<b>454/654 Operations Research</b> 3	<b>479/679 Introduction to Data Mining</b> 3	<b>724 Survey of Artificial Intelligence</b> 3
Deterministic and probabilistic models of operations research: networks and project management, dynamic programming, non-linear programming, inventory, queuing, reliability, stochastic processes, and simulation. Prereq: CSCI 453/653, STAT 367.	Introduction to data mining includes basic data mining techniques, querying, spreadsheet data mining, data warehouses, evaluation techniques, knowledge discovery in databases, examples and a survey of advanced techniques. Prereq: Basic database course (e.g. CSCI 366, 468, 668, or 765).	Survey of major areas of AI including theorem proving, heuristic search, problem solving, computer analysis of scenes, robotics, natural language understanding, and knowledge-based systems. Prereq: CSCI 372.
<b>458/658 Microcomputer Graphics</b> 3	<b>488/688 Human-Computer Interaction</b> 3	<b>728 Computer Graphics</b> 3
Information on the techniques by which computers generate images of 2 and 3D objects. Principles to guide the use of computer graphics to enhance human-computer interaction. Prereq: CSCI 372, MATH 146 or 165.	Survey of the methodologies and alternatives used in developing and evaluating human-computer interfaces. Prereq: CSCI 372.	Principles and algorithms used in computer graphics packages. Emphasis on raster graphics, clipping, hidden-surface elimination, ray-tracing, radiosity.
<b>459/659 Foundations of Computer Networks</b> 3	<b>489/689 Social Implications of Computers</b> 3	<b>730 Office Information Systems</b> 3
This is an introduction to fundamental concepts for the design and analysis of broadband networks. Topics include resource allocation, routing, congestion control, medium access, scheduling, and multicast. Concepts are applied to state-of-the-art systems and protocols such as current and future Internet protocols.	Capstone course for Computer Science. Presentation and discussion of several ethical and social issues that have arisen from the introduction of the computer including copy-protected software and liability for computer software errors. Prereq: CSCI 372, 467.	Exploration of the evolution of the office since the introduction of the computer. Examination of the introduction of computers, word processors, database management systems, networks, and AI into the office. Prereq: CSCI 160.
	<b>702 Performance Evaluation</b> 3	<b>732 Introduction to Bioinformatics</b> 3
	Examination of basic techniques used to evaluate multi-programming systems. Both queuing models and other analytical approaches are constructed with simulation and direct measurements of actual systems. Prereq: CSCI 475.	See Mathematics for description.

<b>734 Expert Systems</b> 3	<b>762 Network Flows</b> 3	<b>CONSTRUCTION MANAGEMENT AND ENGINEERING (CM&amp;E)</b> McIntyre, Chair; Asa, DeSaram, Nguyen
Examination of types of expert systems, their powers and limitations. Students write their own expert system. Prereq: CSCI 724.	Theory and algorithms for network flow optimization including network representation data structures, basic change methods, maximum flow, shortest path, minimum cost problems, and generalized networks. Prereq: CSCI 653.	
<b>735 Neural Networks</b> 3	<b>765 Introduction to Database Systems</b> 3	<b>COURSES</b>
Introduction to the parallel processing paradigms that have been developed recently including neuronetworks and genetic algorithms. Students will work on projects using these tools. Prereq: CSCI 724. Cross-listed with PSYC and IME 774.	Basic database concepts, models, management facilities, data structures, storage structures, data definition languages, data manipulation languages, normalization, operator implementation algorithms, transactions, correctness, reliability, distribution, performance analysis. Prereq: CSCI 366.	<b>111 Introduction to Construction Management and Engineering</b> 1
<b>737 System Simulation</b> 3	<b>766 Database System Internals</b> 3	Review of the history of engineering and construction, duty, and role of the professional engineer, construction engineer, and construction manager. 1 lecture. F
Systems, models, discrete event simulation models, queuing systems, fundamental statistics of simulation. Prereq: CSCI 653.	Transaction management, processing; correctness; recoverability; serializability (conflict and view); concurrency control (2PL, BTO, SGT, multiversion); recovery; distributed systems (correctness, recovery, replication); query processing and optimization. Prereq: CSCI 765.	<b>200 Construction Documents and Codes</b> 3
<b>741 Algorithm Analysis</b> 3	<b>773 Foundations of the Digital Enterprise</b> 3	This course is an introduction to construction working drawings; methods and materials of construction; and the International Building Code. Prereq: Construction Management major.
Algorithm design and analysis, asymptotic analysis, worst and average case, recurrences, generating functions, divide-and-conquer, the greedy method, search and traversal, backtracking, branch-and-bound. Prereq: CSCI 161, MATH 166.	See department for description.	<b>204 Construction Surveying</b> 2
<b>742 Algorithms and Complexity</b> 3	<b>774 Topics of the Digital Enterprise</b> 3	This course is an introduction to basic construction surveying and the tools used for building construction and site layout. Prereq: MATH 105, Construction Management major.
Linear and nonlinear recurrences, algebraic problems, fast Fourier transforms, lower bound theory, computational geometry, the classes P and NP-completeness, Cook's theorem, NP-hard problems. Prereq: CSCI 741.	Topics in database, networks, cryptography, security, and software engineering as they apply to the digital enterprise. Prereq: CSCI 315. Recommended: CSCI 783.	<b>205 Building Construction</b> 3
<b>745 Formal Methods for Software Development</b> 3	<b>778 Computer Networks</b> 3	Introduction to planning, design, and construction of residential structures, including cost estimating and project scheduling. Computer applications. 3 lectures. S
The course is a high level course with the aim of formal representation to be able to formally assess characteristics of software. The formal representations are based on the theoretical foundations of computer sciences such as set theory, logic or graph theory. Prereq: CSCI 713.	Examination of computer networks using the ISO-OSI model as a framework. Practical and theoretical issues are explored in modems, codes, error, impairments, modulation, protocols, and interfaces. Prereq: CSCI 474.	<b>212 Construction Graphic Communications</b> 3
<b>746 Development of Distributed Systems</b> 3	<b>779 Advanced Data Mining</b> 3	An introduction to the vocabulary and methods of manual and graphic design using conventional drafting techniques followed by an introduction to computer aided drafting in the relation of drawings for construction. The final project involves a comprehensive project layout using the techniques introduced in the course. Prereq: Construction Management major.
This course is an advanced course in software engineering aiming at strategies and solutions of distributed systems. It assumes the knowledge of software engineering and particularly design and implementation of software systems, then builds on these concepts to how distributed systems are designed and implemented. Prereq: CSCI 713.	Advanced data mining includes in-depth coverage of Association Rule Mining (ARM), Classification and Clustering. The course is designed for those interested in doing research in data mining. Prereq: CSCI 479/679.	<b>240 Financial Cost Concepts for Construction Managers</b> 3
<b>747 Software Complexity Metrics</b> 3	<b>780 Methods of Optimization</b> 3	This course provides an exposure to aspects of financial management related to the construction process, including cost control, cash flow, financial documents, and cost reports. Prereq: ACCT 102, ECON 105, Construction Management major.
This course covers complexity metrics for the entire software lifecycle. Students gain experience in using requirements metrics, design metrics, program metrics, test metrics, and planning metrics. The effectiveness and limitations of metrics in all these areas are emphasized. Prereq: CSCI 718.	Elements of convex analysis, constrained and unconstrained multi-dimensional linear and nonlinear optimization theory and algorithms, convergence properties and computational complexity. Prereq: CSCI 453/653. Cross-listed with MATH.	<b>250 Construction Statics and Mechanics</b> 3
<b>759 Computational Methods in Bioinformatics</b> 3	<b>783 Topics in Software Systems</b> 3	This course provides a non-engineering overview of the principles of statics and strength of materials and applications in the construction industry. Emphasis is placed on the behavior of structural components associated with construction processes. Prereq: MATH 165, Construction Management major.
An introduction to computer science and operations research methods and algorithms that are used for analysis and solution of optimization and other models in bioinformatics.	Includes an area of computer science not otherwise treated in computer science courses. Varies each time offered. May be repeated.	<b>301 Construction Technology and Equipment</b> 4
<b>760 Dynamic Programming</b> 3	<b>785 Topics in Computer Architecture</b> 3	Study of construction techniques, analysis of equipment costs, production, and methods of proper equipment selection. Analysis of earth moving equipment, dewatering systems, and aggregate production. Prereq: CE 309 or CM&E 325, CE 316 or CM&E 320, IME 440. S
Dynamic programming as an algorithm design method, formulating and solving problems using dynamic programming, deterministic and stochastic problems in OR and CS. Prereq: MATH 166.	Includes an area of computer architecture not considered in other courses. Varies each time offered. May be repeated.	<b>310 Construction Quality Control Management</b> 2
<b>761 Integer Programming</b> 3	<b>787 Topics in Operations Research</b> 3	Discussion of inspection procedures and requirements; design and management of quality control/assurance programs for design and construction phases of a project. Includes statistical quality control methods and total quality management in construction. 2 lectures. Prereq: Junior standing. Coreq: STAT 330 or IME 460. S
Integer linear programs and modeling, theory and algorithms, duality and relaxation, cutting plane and branch-and-bound methods, combinatorial problems, total unimodularity, matching and matroids. Prereq: CSCI 653.	Includes an area of operational research not considered in other courses. Varies each time offered. May be repeated.	
	<b>789 Topics in Theoretical Computer Science</b> 3	
	Includes an area of theoretical computer science not considered in other courses. Varies each time offered. May be repeated.	

<b>315 Specifications and Contracts</b> 3	<b>420 Labor Productivity in Construction</b> 3	<b>714 Career Counseling and Testing</b> 3
Discussion of procedures used to prepare and administer construction specifications and contracts. Construction Specification Institute format and AIA Documents and General Conditions are discussed. Also discusses the liabilities and incentives for various kinds of construction contracts. 3 lectures. Prereq: Junior standing. F	Study of the many complex issues relating to labor productivity, labor contracts and regulations, and the effective use of labor resources. 3 lectures. Prereq: CM&E 315, 411, Senior standing. S	Study of theories of career development and the use of career information and testing in career counseling.
<b>320 Soils and Foundations</b> 4	<b>421 Electrical and Mechanical Construction</b> 3	<b>715 Professional Orientation and Ethics</b> 3
Topics include physical properties of soils, stress, settlement, consolidation, slope stability, earth pressures, bearing capacity, drainage, pore pressure, and foundations. 3 lectures, 1 three-hour laboratory. Prereq: ME 223, CM&E 325. F	Basic understanding of electrical and mechanical systems, design and construction procedures used, flexibility in each system, space requirements, and at what point in the job the work on a particular system is done. 3 lectures. Prereq: PHYS 212, Senior standing. S	Introduction to dealing with professional and ethical responsibilities and multicultural issues in the counseling field.
<b>325 Fluid Mechanics for Technologists</b> 3	<b>425/625 Decision Making and Risk Analysis</b> 3	<b>716 Social &amp; Cultural Foundations of Counseling</b> 3
Basic principles of fluid mechanics are introduced with an emphasis on topics pertinent to construction management students. Topics include fluid properties, fluid statics, fluid kinematics, energy and impulse-momentum considerations in fluid flow, pumping systems, steady uniform flow in open channels, fluid measurements, and forces on immersed bodies. Prereq: ME 221. S	Decision-making and decision theory. Decision support systems, applied risk identification, and analysis in construction activities. Computer applications. 3 lectures. Prereq: CM&E 403. S	Issues and trends in counseling with multicultural and diverse populations within our society. Prereq: CNED 710, 711.
<b>370 Introduction to Cost Estimating</b> 2	<b>430/630 Land Development</b> 3	<b>720 Group Counseling</b> 3
Includes plan reading, definitions of drawing symbols, and material takeoff for estimating quantities for a commercial construction project using the Construction Specifications Institute Technical Divisions 1 through 16. 2 lectures. Prereq: Junior standing. F	Practical applications of the planning, design, and construction phases of the land development process. Computer applications. 3 lectures. Prereq: CE 204, Senior standing. F	Study of group counseling principles appropriate to various counseling settings including schools, treatment centers, and agencies. Includes a group experience. Prereq: CNED 710, 711.
<b>385 Construction Safety</b> 2	<b>450 Steel Design for Technologists</b> 3	<b>723 Assessment and Diagnosis in Counseling</b> 3
Planning and administration of construction safety programs. Includes the history and development of federal and state construction safety standards and the methods for abatement and control of job site hazards to develop a safe construction project. 2 lectures. S	Selection of metal structural systems with simplified design and structural characteristics of members and connections. Methods of assembly. 3 lectures. Prereq: ME 223. F	Assessment and diagnostic procedures: how to use appropriate tools for accurate diagnosis and assessment, how to interpret assessment and diagnostic instruments, and how to make effective use of assessment results in counseling with clients.
<b>403/603 Scheduling and Project Control</b> 4	<b>453 Concrete Design and Construction</b> 3	<b>725 Elementary School Counseling</b> 2
Includes theories, principles, and techniques of construction planning and scheduling; emphasizes the management of time, costs, and other resources through the preparation and analysis of network schedules. Computer applications. 4 lectures. Prereq: CM&E 411. F	Fundamentals of design for concrete mix. Formwork and concrete structures. 3 lectures. Prereq: ME 223. S	Exploration of models of elementary counseling and examination of counseling materials in implementing a counseling program.
<b>409 Highway Construction</b> 2	<b>455 Formwork Design</b> 2	<b>726 Middle School Counseling</b> 2
Attention is given to the design and construction of flexible and rigid pavements including sub-grade, base courses, surface courses; evaluation criteria including soil, climate, traffic, material, drainage, initial and maintenance cost considerations; construction practices. 2 lectures. Prereq: CE 316. S	Design and construction of formwork structures for concrete structures. Computer applications. 2 lectures. Prereq: ME 223.	Exploration of models for middle school counseling and examination of counseling materials for middle school counseling programs.
<b>411/611 Construction Cost Estimating</b> 2	<b>489 Construction Design Capstone</b> 3	<b>727 Secondary School Counseling</b> 2
This course covers quantity takeoffs, labor, materials, equipment, overhead cost, profit, and bidding strategies. Computer software is used. 2 lectures. Prereq: CM&E 370. S	Capstone project focused on design and construction activities. Prereq: Senior standing in Construction Engineering.	Overview of principles and functions of a secondary school counseling program and examination of secondary school counseling materials.
<b>412/612 Construction Management Capstone</b> 3	<b>782 Public Infrastructure Management and Construction</b> 3	<b>728 Guidance Administration and Consulting</b> 2
Covers the concepts of development and organization of projects, project contract administration, project delivery systems; management methods; management information systems, constructability review, value engineering; and construction productivity. Prereq: CM&E 403.	See Civil Engineering for description.	Role of administrators, counseling personnel, and teachers in the management of and consulting in K-12 counseling programs.
<b>413 Construction Capstone</b> 2	<b>COUNSELOR EDUCATION (CNED)</b>	
Capstone project dealing with a construction project. 2 lectures. Prereq: Senior standing in Construction Management. F, S	Hannon, Hoheisel, Nelson, Nielsen, Sommer	
	<b>COURSES</b>	
	<i>(All courses require admission to the Counselor Education program.)</i>	
	<b>710 Counseling Techniques</b> 3	<b>730 Sexual Functioning and Abuse Issues in Counseling</b> 3
	Basic principles and techniques in the counseling process. Emphasis given to counseling techniques from several counseling orientations.	Study of sexual dysfunction, incest and abuse, and strategies of intervention and counseling with victims and perpetrators. Prereq: CNED 710, 711.
	<b>711 Counseling Theory</b> 3	<b>731 Counseling Children and Adolescents</b> 3
	Study of various theories and philosophies of counseling and therapy.	Counseling with children and adolescents including specific counseling strategies; mental, physical, and emotional development issues related to counseling. Prereq: CNED 710, 711.
	<b>712 Dynamics of Self</b> 3	<b>732 Family Counseling</b> 3
	Application of personality theory and the life stages to human behavior and the counseling process.	Principles and techniques of family counseling, study of family dynamics, family systems, and theories of family counseling. Prereq: CNED 710, 711.
	<b>713 Assessment Techniques</b> 3	<b>733 Marital Counseling</b> 3
	Techniques and procedures of studying the individual and diagnostic process in identifying client issues. Prereq: CNED 710, 711.	Survey of marital counseling theories and techniques; analyses of dysfunctional communications. Prereq: CNED 710, 711.
		<b>734 Dynamics of Addiction</b> 3
		Study of the theories and scope of addiction from both the personal and social viewpoints with consideration given to the impact on the family. Prereq: CNED 710, 711.

*(The following courses require Admission to doctoral program and completion of master's program courses.)*

**763 Advanced Testing and Appraisal 3**

Theory, methods and techniques of assessment of client strength(s) and deficit(s) will be examined. Common instruments used in counseling will be studied, as well as their administration and interpretation.

**767 Advanced Group Counseling 3**

Theory and practice of group facilitation will be covered, building on the student's current expertise. Supervised practice in group work is included.

**769 Theory and Practice for Counselor Educators 3**

Instructional models, educational techniques and the unique relationship between counselor educator and counseling student will be featured. Supervised experience in facilitating student learning will be included as well as feedback from the professor and fellow classmates.

**770 Counselor Supervision 3**

Theory and practice of counselor supervision. Major schools of thought in counselor supervision will be examined, as well as the process of supervision and relationship between supervisor and supervisee.

**771 Counselor Education and Supervision in a Multicultural Society 3**

An overview of becoming a professor in Counselor Education. The nature, scope and vista of being a scholar, educator, supervisor and practitioner in a multicultural context will be explored.

**772 Advanced Counseling Theories 3**

An exploration of what constitutes the human condition. Appropriate components of good theory will be addressed and the major schools of thought within counseling theory will be surveyed.

**776 Qualitative Research and Program Evaluation 3**

Major approaches in qualitative research in counseling and counselor education will be examined. Theory and practice issues will be included, as well as data analysis. Positivist and non-positivist approaches will be explored.

**779 Quantitative and Survey Research 3**

In-depth analysis of theory, method and technique for conceptualizing and conducting quantitative research in counseling and counselor education will be examined. Survey design and methodology will be included.

**780 Ethical and Legal Issues in Counselor Education 3**

Current challenges in counselor education regarding ethical and legal issues in the practice of counselor education and supervision. Equivalent to EDUC 757.

**787 Professional Issues: Professional Development, Consultation and Publishing 3**

A seminar that addresses the following: needs of practitioners for professional development, both as consumers and providers; theory and practice of consultation; and, the process of developing, writing and submitting manuscripts for publication.

## CRIMINAL JUSTICE (CJ)

Thompson, Chair: Archbold, Jordheim, McDonald

### COURSES

**201 Introduction to Criminal Justice (CCN) 3**

Examination of the criminal justice system and process. Includes crime, lawmaking, criminality, prosecution, police, courts, and corrections.

**226 Criminal Investigation (CCN) 2**

Researches the process of gathering information and evidence in solving crimes. Focus on the role of evidence gathering and its importance to prosecuting cases and administering justice.

**230 Criminology and Criminal Law 3**

Study of criminal behavior and the measurement of crime and victimization. Major theories of crime causation and specific types of crime will be examined.

**325 Applied Research Methods 4**

See Political Science for description.

**330 Criminal Law and Procedure 2**

Examination of criminal law and procedure including search and seizure laws, rights of defendants and victims, and due process in criminal law.

**406/606 Crime and Delinquency 3**

Study of the nature and extent of juvenile delinquency. Analysis of causes of juvenile offending and an exploration of policies to combat delinquency. Prereq: Junior standing.

**407/607 Deviant Behavior 3**

Analysis of the precursors, the processes, and the consequences of deviance in Western society. Prereq: SOC 110 or PSYC 111. Cross-listed with SOC.

**460/660 Criminalization 3**

Analysis of historical and contemporary developments in the functions of police and courts. Focuses on societal, inter- and intra-organization contexts.

**461/661 Corrections 3**

Analysis of institutional and community-centered corrections. Emphasis on historical, contemporary, and developing trends regarding structures, program content, and problems.

**489 Senior Capstone in Criminal Justice 1**

Synthesis of criminal justice research, methods, and criminological theory. Prereq: Senior standing.

**702 Program Evaluation 3**

Examination of the development and implementation of criminal justice program/policy evaluation, including the techniques of applied research and practical considerations. Topics also include ethical issues, evaluation planning, process, impact and cost-benefits analyses, grant writing, and dissemination of findings.

**703 Advanced Criminology 3**

Advanced study of the distribution of crime and the major theories of crime causation from an interdisciplinary perspective, including special attention to issues relating to the measurement, nature, and extent of crime in the US.

**707 Juvenile Corrections 3**

Examination of the history of ideas about and responses to juvenile delinquency, the scope and nature historically and today, and the responses by various parts of the juvenile justice system, as well as responses by other social institutions such as the family, community and schools.

**709 Criminal Justice Policy 3**

Examination of concepts related to the development, implementation, and evaluation of public policy as it relates to the criminal justice system, including the history, development and operation of policing, courts/sentencing, corrections, crime prevention, offender rehabilitation, and issues related to drugs and crime and race and crime.

**721 Individual Theories of Crime 3**

Review of historical and contemporary individual theories of crime. Discussion of the assumptions, causes, and policy implications of criminological theories. Prereq: CJ 703.

**722 Structural Theories of Crime 3**

Review of historical and contemporary structural theories of crime, including criteria of good theory, the assumptions of various criminological theories, and the similarities and differences in theories. Prereq: CJ 703.

**750 Violence 3**

Examination of various aspects of criminal violence, including various social settings (e.g., community, domestic, and school) with attention to the causes, consequences, moderating factors and proposed solutions associated with violent criminal behavior.

**752 Criminogenic Commodities 3**

Examination of the role of drugs, guns, and gangs in contributing to crime. Analysis of the laws pertaining to drugs, guns, and gangs and their impact on criminality.

**754 Criminal Investigations 3**

Research on the process of gathering information and evidence in the administration of justice. Focus on the role of evidence gathering and its importance to disseminating justice.

**755 Administrative Policing 3**

Organizational theory, leadership, communication, labor relations, and crisis management in police administration.

**757 Community Policing 3**

Examination of the history, philosophy, theory, and implementation of community policing. Comparison of community policing styles with other policing styles.

**759 Security Management 3**

Examination of public and private security concerns and methods for addressing them. Analysis of protection of money, materials, information, and secrets.

**760 Police and Race Issues 3**

Provides an in-depth, historical, and contemporary view of the police and race issues in the United States. Discussions on diversity, use of force, racial profiling, and citizen complaints.

**761 Police Effectiveness 3**

Examines effectiveness of police delivery services in the U.S. Examines theories and scrutinizes factors that are associated with police effectiveness.



<b>762 Community Corrections</b>	<b>3</b>	<b>456/656 History of Economic Thought</b>	<b>3</b>	<b>122 Interpersonal Relationships</b>	<b>1</b>
Evaluation of practices, issues, and trends in community corrections. Focus on probation, parole, halfway houses, and other community alternatives to incarceration.		Development of economic thought from the mercantilists to Keynesian economics. Prereq: ECON 341 or BUSN 451 and ECON 324 or 343.		Study of the development of interpersonal relationships with a focus on listening and sharing in an experiential manner.	
<b>763 Correctional Rehabilitation</b>	<b>3</b>	<b>461/661 Economic Development</b>	<b>3</b>	<b>123 Study Skills</b>	<b>1</b>
Examines issues related to the implementation and effectiveness of various correctional treatment approaches and programs. In-depth examination of the history, purpose and common targets of correctional treatment interventions.		Analysis of the main causes of economic development. Prereq: ECON 341 or BUSN 451.		Assistance in the development of study skills necessary for academic achievement through learning and practice.	
<b>765 Crime Prevention</b>	<b>3</b>	<b>465/665 Labor Economics</b>	<b>3</b>	<b>124 Career Planning</b>	<b>1</b>
Examination of the theoretical underpinning, implementation and effectiveness of crime prevention approaches within and outside of the traditional settings of law enforcement, courts and corrections, including schools, families, labor markets, and the community.		Theoretical analysis and survey of empirical studies relating to labor markets, human capital formation, and nature and causes of unemployment. Prereq: ECON 341 or BUSN 451.		Study of the world of work with attention to self-assessment, vocational choice, and career planning.	
<b>768 Gender and Justice</b>	<b>3</b>	<b>470/670 Public Finance</b>	<b>3</b>	<b>125 Assertiveness Training</b>	<b>1</b>
Examination of the role of gender in crime and the criminal justice system, including the changing roles of men and women in society, differential involvement in criminal behavior, and differential criminal justice response.		Taxation, intergovernmental fiscal relations, and public expenditures; implications of various taxation policies. Prereq: ECON 341 or BUSN 451.		Behavioral approach to assertiveness combining a cognitive approach with role-play and discussion.	
<b>ECONOMICS (ECON)</b>		<b>472/672 International Trade</b>	<b>3</b>	<b>300 Orientation to Elementary Teaching</b>	<b>2</b>
Lambert, Chair; Garosi, Gustafson, Hearne, Herren, Koo, B. Leitch, Lim, Mack, McKee		Theories of international trade, payments, and foreign exchange markets. Prereq: ECON 341 or BUSN 451.		Overview of elementary education with special emphasis on the role of music and physical education. Required for K-12 certification in music and physical education.	
<b>COURSES</b>		<b>476/676 Monetary Theory and Policy</b>	<b>3</b>	<b>321 Introduction to Teaching</b>	<b>3</b>
<b>105 Elements of Economics (CCN)</b>	<b>3</b>	Analysis of relationships among money, credit, employment, price stability, and national monetary policy. Prereq: ECON 324 or 343.		Nature and aims of education at middle and high school levels; social, philosophical, historical, curricular, and political foundations in a changing multicultural society; analyze teaching as a career choice, initiate teacher education program exit portfolio. Recommended coreq: EDUC 381.	
Study of demand and supply, competitive and noncompetitive markets, concepts of national income, unemployment, inflation, money, and fiscal and monetary policies. This course cannot be substituted for ECON 201 and 202. (ND:SS)		<b>480/680 Industrial Organization</b>	<b>3</b>	<b>322 Educational Psychology</b>	<b>3</b>
<b>201 Principles of Microeconomics (CCN)</b>	<b>3</b>	Structural analysis of American industry in terms of the markets for business enterprise. Analysis of antitrust policy and its application to large corporations. Prereq: ECON 341 or BUSN 451.		Review of human development with special emphasis on development of the young adolescent. Learning theories and learning styles with applications to individual student differences, exceptionalities, and cultural diversity; strong emphasis on educational research.	
Nature, method, and scope of economic analysis; economic scarcity, resources, specialization of labor; supply-demand analysis; production and cost analysis; product and resource market structures; distribution of income; international trade. (ND:SS)		<b>481/681 Natural Resource Economics</b>	<b>3</b>	<b>381 Early Experience</b>	<b>1</b>
<b>202 Principles of Macroeconomics (CCN)</b>	<b>3</b>	Application of economic tools to evaluate natural resource policies. Concepts such as property rights, non-market goods, resource allocation over time, externalities, open access, and public goods are discussed in an intermediate micro-economics and calculus-based format. Prereq: ECON 341 or BUSN 451.		Field-based experience in a middle or high school setting. Overview of professional educators; opportunity to observe and interact with students, teachers, and administrators. At least five hours required in special education classroom with ESL teacher. Recommended coreq: EDUC 321. Cross-listed with H&CE.	
Aggregate income and employment analysis; business cycles, unemployment, inflation and economic growth; fiscal policy; money and monetary policy; the U.S. economy and the world economy. (ND:SS)		<b>482 Environmental Economics</b>	<b>3</b>	<b>451/651P Instructional Planning, Methods, and Assessment</b>	<b>3</b>
<b>324 Money and Banking</b>	<b>3</b>	Application of economic tools to evaluate environmental policies. Topics include cost benefit analysis, regulatory versus market pollution control approaches, environmental damage assessment, and green accounting. Prereq: ECON 341 or BUSN 451.		Process of planning for teaching and implementing plans; micro-teaching activities reflecting various models for middle and high school classrooms; personalizing instruction; meeting multicultural needs. Includes computer applications; use of audiovisual equipment and other resources. Prereq: EDUC 321, 322, 381, admission to School of Education.	
Institutional and theoretical framework of the financial structure including the banking system, Federal Reserve, money markets, and international monetary systems. Prereq: ECON 201, 202.		<b>710 [AGEC] Advanced Econometrics</b>	<b>3</b>	<b>460/660 Adolescent Readers</b>	<b>3</b>
<b>341 Intermediate Microeconomics</b>	<b>3</b>	Advanced econometric methods applied to time series and panel data analysis, limited dependent variable models, maximum likelihood estimation, systems estimation, and discrete choice models. Prereq: ECON 410/610.		This course focuses on developmental reading instruction, including relevant theories, the process of reading, important research, and instructional practice for adolescent-aged learners.	
Analysis of markets in terms of efficiency, resource use, and economic welfare. Prereq: ECON 201, 202, MATH 146.		<b>EDUCATION (EDUC)</b>		<b>471/671 Middle School Philosophy and Curriculum</b>	<b>2</b>
<b>343 Intermediate Macroeconomics</b>	<b>3</b>	Martin, Chair; Borr, Daniels, Duffield, Eighmy, Hall, Hanson, Ketterling, Lajimodi, Overton, Rusaw, Schmidt, Stammen, Wageman, Warner, Young		Educational foundations for middle schools, essential to meeting young adolescent needs and improving their learning. Identifies and expands central ideas in philosophy, historical background, curriculum, facilitating learning, organizational structures and practices, assessment, and planning. Prereq: EDUC 451 or Graduate standing.	
Analysis of national output, business cycles, inflation, unemployment rates, interest rates, exchange rates, impact of monetary and fiscal policies, and economic growth. Prereq: ECON 201, 202.		<b>COURSES</b>			
<b>410/610 Introduction to Econometrics</b>	<b>3</b>	<b>120 Peer Counseling</b>	<b>1</b>		
Introduction to estimation, hypothesis-testing techniques and econometric applications in economics, with emphasis on ordinary least squares regression analysis. Use of econometric software reinforces econometric theory and methods through applications to economic data. Prereq: ECON 341, STAT 330.		Designed to bring peer counseling theory and practice together in helping freshmen overcome the hurdles of the first year. May be repeated.			
		<b>121 Improvement of Reading</b>	<b>1</b>		
		A developmental reading program designed to help the student improve in reading efficiency.			

<b>472/672 Middle Level Teaching Methods</b> 3	<b>705 Teaching College Science</b> 3	<b>725 Institutional Analysis Techniques</b> 3
Instruction and guidance in the design, implementation, and assessment of teaching strategies adapted to young adolescents. Prereq: EDUC 451 or Graduate standing.	See Biological Sciences (Biology) for description.	Surveys, focus groups, longitudinal studies, national data sets, correct statistical design and analyses, and effective reporting techniques will be reviewed and utilized in depth to address questions of institutional performance in academic and student affairs. Prereq: Admission to doctoral program.
<b>475 Reading in the Content Area</b> 2	<b>710 Philosophy of Education</b> 2	<b>727 Higher Education Law</b> 3
Introduction to the relevance and need for incorporating reading and developing reading skills in middle and high school classrooms.	Major philosophical concepts and principles of education from Plato to the present.	To develop expertise in legal issues for students whose current positions or future career goals include administrative and management positions in higher education where they will work on legal issues with attorneys. Prereq: Admission to doctoral program.
<b>480 Stress Management</b> 2	<b>712 Social, Cultural, and Political Dimensions of Schools</b> 4	<b>728 Instructional Technology for Teaching and Learning</b> 3
The dynamics of stress, sources and symptoms of stress, and stress management techniques will be presented and practiced.	Social processes and interaction among diverse populations in educational settings. Relationship of schools to society.	This course provides an advanced understanding of technology concepts and contemporary computer-based programs for the teaching and learning processes. Prereq: Admission to doctoral program.
<b>481/681P, 482/682P, 483/683P Classroom Practice/Methods of Teaching I, II, III</b> 2-3 each	<b>714 History of American Education</b> 2	<b>729 Organization and Administration of Telecommunication Technologies</b> 3
Specialized methods and classroom practices appropriate to the specific subject area. May be repeated. Prereq: EDUC 321, 322, 381, admission to School of Education. For 482/682P: EDUC 481/681P. For 483/683P: EDUC 482/682P.	Historical and intellectual development of education in the United States from the colonial period to the present.	This course provides the procedures for developing videoconferencing training materials to prepare faculty, students and staff to effectively use the videoconferencing equipment both for meetings and instruction. Prereq: Admission to doctoral program.
<b>485/685P Student Teaching Seminar</b> 1	<b>715 The Superintendency</b> 2	<b>730 Leadership, Planning, and Organizational Behavior</b> 3
Orientation to student teaching. Analysis of professional issues and concerns associated with education. Prereq: EDUC 489/689P, 451/651P, 483/683P, 486/686P. Coreq: EDUC 487/687P.	This course deals with examining the role and functions of the public school district administrator.	Introduction to models of educational leadership including organizational structure, theory, and leadership styles. Consideration of concepts, problems, and issues in administration.
<b>486/686P Classroom Management for Diverse Learners</b> 2	<b>716 Comparative Education</b> 2	<b>731 Educational Law and Organizational Structure of Schools</b> 3
Examine and apply various classroom management and evaluation techniques to middle and high school levels. Prereq: EDUC 321, 322, 381, admission to School of Education.	Analysis of educational systems of selected nations, including emerging and economically developed countries.	Examination of the legislative and judicial actions affecting the public schools. Consideration is given to contemporary legal issues for teachers, administrators, and boards.
<b>487/687P Student Teaching</b> 9	<b>717 Adult Learning</b> 2	<b>732 Curriculum, Instruction, and Learning Theory</b> 4
Supervised teaching in an approved and accredited school. Includes an on-campus seminar. Prereq: Admission to School of Education, completion of professional education sequence. Coreq: EDUC 485/685P or H&CE 483/683P, EDUC 488/688. Cross-listed with H&CE.	Includes recent research concerning adult learning in the context of planning and operating effective adult education programs.	Investigation of curricular decision-making and program evaluation strategies as they affect the educational program. Problem-solving skills are presented through theory and simulation.
<b>488/688P Applied Student Teaching</b> 3	<b>718 Community Education</b> 2	<b>733 Technology and Information Systems</b> 2
Guided student teaching experience including application of lesson planning, portfolio development, professional goal-setting, and supervised teaching in an approved and accredited school. Prereq: Admission to School of Education, completion of professional education sequence. Coreq: EDUC 485/685P or H&CE 483P, EDUC 487/687P. Cross-listed with H&CE.	Study of the theory base on which community education is founded. Consideration is given to implementing the concept in the community with available resources.	Provides an understanding of selected computer applications for educational administrators at the building and district office levels.
<b>489/689 Native Americans and Multicultural Instructional Practices</b> 3	<b>719 Planning and Conducting Needs Assessment</b> 3	<b>734 Personal Communications and Ethics</b> 3
History of North Dakota tribes and reservations. Traditional and modern Native American cultures and values. Issues in Native American education. Goals of multicultural education. Instructional strategies and resources for teaching students of diverse ethnic backgrounds. Prereq: EDUC 321, 322, admission to School of Education.	A three-phase model will be compared and contrasted to provide the skill and knowledge necessary for conducting needs assessments for educational schools and institutions. Prereq: Admission to doctoral program.	Prepares aspiring school leaders to plan for their personal and professional development and to understand and use the principles of communication, ethics, and values.
<b>702 Statistics in Educational Research</b> 2	<b>720 Supervision of Student Teachers</b> 2	<b>735 Personnel, Supervision, and Staff Development</b> 4
Basic theory; techniques for using descriptive and inferential statistics; application in educational research designs.	Planning and carrying out effective supervision techniques when supervising student teachers in respective subjects.	Specific techniques and systems to supervise instruction. Review of interpersonal communication and group process skills as applied to administrative supervision.
<b>703 Research, Measurement, and Program Evaluation</b> 3	<b>721 Assessment Techniques for Educational Institutions</b> 3	<b>736 Policy and Educational Finance</b> 2
Methodology and design of research studies; organization, reporting analysis, and interpretation of research.	This course addresses all aspects of educational assessments in order to select the assessment technique that meets specific accountability mandates in the field of education. Prereq: Admission to doctoral program.	Provides school leaders with an understanding of managing and allocating resources in a political climate in which policy decisions are based on historical resource allocations.
	<b>722 Instructional Systems, Media, Materials</b> 2	<b>737 The Helping Relationship and the Elderly</b> 3
	Preparation of instructional systems in support of a variety of teaching techniques and alternative media approaches.	The theoretical foundations and the techniques of the helping relationship between the helper and people of advanced age will be studied and applied.
	<b>723 Diversity and Educational Policy</b> 3	
	The purpose of this course is to help educators understand ethnic and racial identity formations among high school and college students of racially mixed heritage. Prereq: Admission to doctoral program.	
	<b>724 Advanced Educational Psychology</b> 2	
	Principles of effective human learning. Discussion of learning theories, the teacher as a director of learning experiences, and factors in students representing a variety of cultures and abilities in the educational setting.	

<b>738 Administration of Elementary Schools</b> 2	<b>751 Students and Their Learning</b> 3	<b>777 Tort Liability</b> 2
Common elements of leadership as they apply to the principalship. Consideration of practical applications in an elementary school setting.	Exploration of student differences and ways of adjusting teaching practice to meet individual needs. Application of learning theories to educate the whole child (cognitive, affective, social). Equitable treatment of students.	Examination of the legal liability of teachers, administrators, and public school boards for injurious intentional or unintentional acts. Prereq: EDUC 731.
<b>739 Administration of Secondary Schools</b> 2	<b>752 Curriculum Design and Delivery</b> 3	<b>778 School Fund Management</b> 3
Common elements of leadership as they apply to the principalship. Consideration of practical applications in a secondary school setting.	An inquiry-based course for the reflective practitioner to develop deep understandings of curriculum content emphasized by state and national standards documents and to acquire an effective repertoire of instructional skills.	Proper recording and reporting of financial accounts for elementary and secondary schools. Use of procedures and concepts for governmental fund accounting and financial management. Prereq: M.S. in Educational Administration.
<b>740 Financing Higher Education</b> 3	<b>753 Managing and Monitoring Learning</b> 3	<b>779 Quantitative and Survey Research</b> 3
This course provides funding theories and procedures necessary to develop and maintain financing for higher education institutions. Prereq: Admission to doctoral program.	This course is based on the concept that assessment drives instruction. A working definition of student learning will be defined. Multiple measures of assessment will be investigated and impacts on student learning will be explored.	The purpose of this course is to have an in-depth analysis of theory, method, and technique for conceptualizing and conducting quantitative research, survey design and methodology in educational leadership. Prereq: Admission to doctoral program.
<b>741 Higher Education Student Affairs and Enrollment Management</b> 3	<b>763 Education and Training for Business and Industry</b> 3	<b>780 Instructional Models</b> 2
The purpose of this course is to teach about the role of student affairs professionals in schools, colleges, and other educational organizations, including recruitment, selection, orientation, development, compensation, and evaluations. Prereq: Admission to doctoral program.	The purpose of this course is to teach the fundamentals necessary to educate and train people for the workforce according to evolving training needs of business, industry, military and government. Prereq: Admission to doctoral program.	Investigation of current practices and trends in instructional models. Emphasis is on the relationship of current research to contemporary practice.
<b>742 Elementary School Curriculum</b> 2	<b>769 Organization and Administration of Higher Education</b> 3	<b>781 Science Teaching and Curriculum</b> 3
History, development, evaluation, and revision of the curriculum. Review of recent research in elementary school curriculum.	This course deals with the organization and administration of higher education and the current and evolving problems and possibilities for higher education. Prereq: Admission to doctoral program.	Overview of recent research on science teaching, learning, and curriculum. Special attention given to contemporary theories on science teaching models that enhance student understanding.
<b>743 Secondary School Curriculum</b> 2	<b>770 Empowerment and Advocacy in Human Development and Education</b> 3	<b>782 Supervisory and Administrative Theories</b> 4
Study of contemporary curriculum patterns with emphasis on curricular construction and evaluation.	An examination of theory, research, and practice in individual and group empowerment and advocacy in the multi cultural and diverse contexts that contemporary human beings find themselves.	Study of management models and techniques, needs assessment, goal setting, planning and evaluation systems, and decision-making problems as they relate to the school improvement process. Prereq: EDUC 732.
<b>744 Administration of the Middle School</b> 2	<b>771 Structural and Equation Modeling Fundamentals</b> 3	<b>783 Computer Data Management and Decision Making</b> 2
Organization and administration of educational programs for early adolescents with special consideration given to block scheduling, interdisciplinary teams, and advisor-advisee problems.	This course is designed for faculty and doctoral-level students who need a significant familiarity with those statistical techniques known collectively as "structural equation modeling." Prereq: Admission to doctoral program.	Interpretation of effective computer applications for computer use as a decision-making and planning tool for school finance and managerial functions relating to the field of school business administration and school district superintendency. Prereq: EDUC 730, 10 credits in Educational Administration.
<b>745 Program Evaluation Research</b> 3	<b>772 Curriculum and Instructional Development</b> 3	<b>784 School Personnel Administration</b> 2
Major theoretical approaches to the evaluation of educational programs are reviewed, analyzed, and critiqued. Pragmatic implications for educational and social policy are addressed, as well as constructive impact on program decision-making. Prereq: Admission to doctoral program.	A five-phase model will be compared and contrasted to provide the skill and knowledge necessary to establish a systematic curriculum and instructional development. Prereq: Admission to doctoral program.	Study of personnel administration in public school systems. Includes an examination of the purposes, policies, plans, procedures, and personnel administration. Prereq: EDUC 782.
<b>746 Institutional Quality Control</b> 3	<b>775 Content Area Reading</b> 2	<b>785 Organization and Administration of Vocational/ Technical Education</b> 2
History and effecting of quality control will be briefly reviewed. Global, U.S. societal, state government, accreditation, and student accountability forces will be elucidated. Successful, failed, and future institutional responses to these forces will be discussed. Prereq: Admission to doctoral program.	Examination of content, instructional methodologies, and evaluation techniques for reading in content classes.	Overview of the vocational education services of local educational agencies and their relation to post-secondary education. Emphasis on planning, organizing, administering, and managing resources.
<b>748 Collective Bargaining and Negotiation in Education</b> 2	<b>776 Qualitative Research and Program Evaluation</b> 3	<b>786 School Facility Planning</b> 2
Study of the principles and processes of collective bargaining in public educational institutions. Development of negotiation skills through participation in simulations.	The purpose of this course is to address theory and practice approaches in qualitative research for education settings that include data analysis, content analysis, interpretive analysis, positivistic, and non-positivistic. Prereq: Admission to doctoral program.	Overview of the principles in planning, construction, and maintenance of school buildings. Visits to educational facilities and the assessment of school buildings. Prereq: M.S. in Educational Administration
<b>749 Case-Based Educational Research &amp; Statistics</b> 3		<b>787 Issues in Education</b> 2
The purpose of this course is to have graduate students understand statistical meanings and concepts which will provide the professional expertise needed to serve schools and institutions with their contemporary research and accountability needs. Prereq: Admission to doctoral program.		This course delves into the issues of why a person would pursue a doctoral degree in light of the current issues facing educators. Helps define a professional course of study available in respect to educational issues. Leads to studying creators and leaders in different realms by people who have special interest in creativity and ethical pursuits.
<b>750 Reflective Practice and Research in Education</b> 3		
An examination of teaching and professional practice based on reflective practice. Analyze educational research as related to and informs practice.		

<b>788 School Finance and Business Management</b> 4	<b>331 Energy Conversion</b> 4	<b>421/621 Communication Circuits</b> 3
Overview of school fund revenues and expenditures pertaining to local, state, and federal funding. Includes in-depth study of the practices of school business administration pertaining to all fund activities in instruction and ancillary operations.	Magnetic circuits, transformers, DC and AC rotating machines. 3 one-hour lectures, 1 two-hour laboratory. Prereq: ECE 311. S	Resonant circuits and tuned amplifiers, oscillators, modulators and demodulators, phase-locked loops, and power amplifiers. Analysis, design, and applications in communication systems. 3 lectures. Prereq: ECE 321. S
<b>789 School Community Relations</b> 2	<b>341 Random Processes</b> 3	<b>423/623 Digital Electronics</b> 3
Purposes, organization, agencies, and criteria of good school-community relationships; knowledge and techniques for effective public relations. Prereq: EDUC 739, M.S. in Educational Administration.	Principles of probability. Application of probability and statistics to electrical and computer engineering problems. 3 lectures. Prereq: MATH 266. F	Analysis and design of digital integrated circuits. Characteristics and applications of logic gates and regenerative logic circuits. 3 lectures. Prereq: ECE 321. S
<b>ELECTRICAL AND COMPUTER ENGINEERING (ECE)</b>	<b>343 Signals and Systems</b> 4	<b>425/625 Introduction to Semiconductor Devices</b> 3
Ewert, Chair; Dai, Farden, Glower, Green, R. Katti, Kavasseri, Lima, Nelson, Patterson, B. Rao, Rogers, Schroeder, Tareski, You, Yuvarajan	Discrete-time and continuous-time signals and systems. Linearity, frequency response, difference and differential equations, transfer techniques. 4 lectures. Prereq: ECE 311. F, S	Properties and applications of semiconductors and solid-state electronic devices. Semiconductors, junctions, and transistors. 3 lectures. Prereq: ECE 321, 351. F/2
<b>COURSES</b>	<b>351 Applied Electromagnetics</b> 4	<b>431/631 Power Systems</b> 3
<b>111 Introduction to Electrical and Computer Engineering</b> 3	Lecture and laboratory introduction to electromagnetic waves in linear media, effects of boundaries, transmission lines, electrostatics, and magnetostatics. Introduction to time dependence and engineering applications. 4 lectures, 1 two-hour laboratory. Coreq: ECE 311. F, S	Electrical characteristics of high voltage lines. Symmetrical components, per unit system, and transformers. Matrix methods, load flow, and fault analysis. 3 lectures. Prereq: ECE 311. F
Introduction to electrical and computer engineering problem solving, design and professional issues. 3 lectures. Prereq: MATH 105. F	<b>373 Assembly Programming</b> 3	<b>433/633 Power Systems Design</b> 3
<b>173 Introduction to Computing</b> 3	See Computer Science for description. Prereq: ECE 173, 275 with a grade of C or better.	Unbalanced power systems, economic dispatch, transients in power systems, power system stability, power system protection. 3 lectures. Prereq: ECE 311. S
Programming in a high level language with applications to engineering computation, analysis, and design. 3 lectures, 1 recitation. Prereq: MATH 105. F, S	<b>374 Computer Organization</b> 3	<b>437/637 Power Electronics</b> 3
<b>EE 206 Circuit Analysis I (CCN)</b> 4	See Computer Science for description. Prereq: ECE 173, 275 with a grade of C or better.	Characteristics and modeling of power electronic devices. Rectifiers, choppers, and inverters and their applications in power supplies and motor drives. 3 lectures. Prereq: ECE 321. F
Linear electric circuits. Component models, circuit laws, transient analysis, design issues, computer tools. 3 lectures, 1 two-hour recitation/laboratory. Prereq: MATH 129, 166 with a grade of C or better. Coreq: PHYS 252. F, S	<b>375 Digital System Design and Implementation</b> 3	<b>443/643 Communications I</b> 4
<b>275 Digital Systems I</b> 3	Experience with digital system design and prototyping, including use of digital laboratory equipment. 2 lectures, 1 two-hour laboratory. Prereq: ECE 173, 275 with a grade of C or better. F	Communications theory and design with an emphasis on spectral techniques. Modulation and noise effects. 3 lectures, 1 two-hour laboratory. Prereq: ECE 343. Coreq: ECE 341. F, S
Introduction to number systems, combinational circuits, and sequential circuits. 3 lectures. Prereq: MATH 103. Cross-listed with CSCI. F, S (ND:SCI)	<b>376 Embedded Systems</b> 4	<b>444/644 Applied Digital Signal Processing</b> 3
<b>301 Electrical Engineering I</b> 3	Use of microcontrollers for data acquisition and device control. Includes assembly language and high-level programming, serial and parallel I/O, timers and interface design. 3 lectures, 1 two-hour laboratory. Prereq: ECE 173, 275, EE 206 with a grade of C or better. F, S	Digital signal processing theory balanced with practical application. Includes design of FIR, IIR, and adaptive filters; Fast Fourier Transforms; sampling theory; implementation techniques; multi-rate processing. Emphasizes system implementation using development tools and DSP hardware. 3 lectures. Prereq: ECE 173 with a grade of C or better, 343. F
Introduction to electrical engineering for non-majors. Fundamental laws of circuit analysis. Steady-state and transient analysis of DC and AC circuits. 3 lectures. Prereq: MATH 259 or 265, PHYS 252. F, S	<b>401 Design I</b> 1	<b>445/645 Communications II</b> 3
<b>303 Electrical Engineering II</b> 3	Capstone experience in formulation and design of a system or device. Basic project planning and software tools. 1 lecture. Prereq: ECE 321. F, S	Continuation of ECE 443. Digital communications systems. Optimum receivers. Information theory and coding. 3 lectures. Prereq: ECE 443. S/2
Electronic circuits and their applications. Electromechanical energy conversion. Transformers, DC and AC machines. 3 lectures. Prereq: ECE 301. F, S	<b>403 Design II</b> 2	<b>448/648 Image Analysis I</b> 3
<b>306 Electrical Engineering Lab I</b> 1	Capstone experience in formulation and design of a system or device. 2 two-hour design laboratories. Prereq: ECE 401, Senior standing in program. F, S	Image acquisition, resolution, enhancement, restoration, and equalization. Illuminations, reflectance, and noise considerations. Segmentation, shape characterization, and object recognition. Simulation examples, computer problems, and gathering of actual scientific images via camera and computer. Prereq: ECE 343. (alternate years)
Electronic instruments and measurements. Applications to electrical and electronic circuits, power devices, and systems. 1 two-hour laboratory. Coreq: ECE 303. F, S	<b>405 Design III</b> 3	<b>453/653 Signal Integrity</b> 3
<b>311 Circuit Analysis II</b> 4	Capstone experience in formulation and design of a system or device. 3 two-hours design laboratories. Prereq: ECE 403, Senior standing in program. F, S	Topics in system level signal integrity are presented. The construction and design of passive printed circuit cards are discussed, with computer aided design software used for analysis and class presentations. Circuit card fabrication issues and case examples of applications are discussed. Prereq: ECE 311, 351. F/2
Analysis of single-phase and three-phase circuits. Laplace transforms in circuit analysis. Fourier series. Two-port networks. 3 one-hour lectures, 1 two-hour laboratory. Prereq: EE 206 with a grade of C or better. Coreq: MATH 266. F, S	<b>411/611 Optics for Scientists and Engineers</b> 3	
<b>321 Electronics I</b> 5	See Physics for description.	
Characterization and modeling of diodes, BJTs, and FETs. Biasing of transistors. Analysis of transistor amplifiers. Frequency response. Feedback amplifiers. Op amps. Power supplies. BJT and MOS logic gates. 4 one-hour lectures, 1 two-hour laboratory. Coreq: ECE 311. F, S	<b>411L/611L Optics for Scientists and Engineers Laboratory</b> 1	
	See Physics for description.	
	<b>417/617 Optical Signal Transmission</b> 3	
	Optical signal transmission including geometric optics and modal analysis for homogeneous and inhomogeneous light guides. Systems studies including coupling, inter-symbol interference, sources, photodetectors, and modulation. Prereq: ECE 351. S/2	

<b>455/655 Designing for Electromagnetic Compatibility</b> 3	<b>731 Power System Protection</b> 3	<b>EMERGENCY MANAGEMENT (EMGT)</b>
Principles and methods concerning electronic system designs that are not sources of or susceptible to electromagnetic interference. 3 lectures. Laboratory. Prereq: ECE 343, 351. F/2	Power system protective relaying. Generator, transformer, line, bus, motor protection. 3 lectures. Coreq: ECE 433/633. S	Slobin, Chair; Klenow, Oyola-Yemaiel, Wilson, Youngs
<b>461 Control Systems</b> 4	<b>733 Power Distribution</b> 3	<b>COURSES</b>
Analysis and design of control systems. Controller design to meet time and frequency specifications. 3 lectures, 1 two-hour laboratory. Prereq: ECE 343. F	Power distribution systems. Lines and transformers, characteristics of loads, voltage drops and corrective measures, lightning protection. Fault analysis, fuses, reclosers, sectionalizers. Power system harmonics and power quality. 3 lectures. Coreq: ECE 431/631. F	<b>201 Introduction to Emergency Management</b> 3
<b>463/663 Digital Control</b> 3	<b>741 Signal Processing I</b> 3	Introduction to the field of emergency management including its history; the major disaster disciplines (i.e., prevention, preparedness, mitigation, response, and recovery); its integration with homeland security; and its future as a profession.
Analysis and design of sampled-data control systems including z-transforms, sampling theory, design to specifications, controllability, observability, stability, and optimization. 3 lectures. Prereq: ECE 461.	Analysis and design of discrete- and continuous time signals and systems. Advanced treatment of transform techniques and Fourier analysis. Classical filter design techniques. Fast Fourier transform algorithms and applications. 3 lectures. Prereq: ECE 443/643.	<b>210 Emergency and Disasters: A Visual Approach</b> 3
<b>470 Digital Systems II</b> 3	<b>743 Signal Processing II</b> 3	This course studies emergencies and disasters through documentaries and feature films highlighting technological and anthropogenic causes, consequences and management issues. Special attention will be placed upon emergency response operations.
Design and analysis of reliable digital systems through robust information coding, fault avoidance, and fault-tolerance. 3 lectures. Prereq: ECE 275 with a grade of C or better. F	Discrete-time Wiener and Kalman filtering. Least squares signal processing and filter design. Spectral analysis. Adaptive signal processing. 3 lectures. Prereq: ECE 741. S	<b>411/611 Community Disaster Preparation</b> 3
<b>471 Computer Systems Design and Implementation</b> 3	<b>745 Statistical Communications</b> 3	Nature and rationale for public awareness of potential hazards that communities face, preparedness for these hazards, and potential strategies to mitigate adverse consequences.
Design and implementation of reliable, interrupt driven systems. Use of development tools. System components issues including co-processors, buses, run-time. Prereq: ECE 376, 401, CSCI 474. S	Advanced topics in communications theory including detection theory, estimation theory, and information theory. 3 lectures. Prereq: ECE 443/643. S	<b>413/613 Building Disaster Resilient Communities</b> 3
<b>483/683 Instrumentation for Engineers</b> 3	<b>748 Elements of Information Theory</b> 3	Role of emergency management programs in community resilience and sustainability; incorporation of preparedness, mitigation, response, and recovery in community comprehensive and strategic planning.
Study of instrumentation including design, fabrication, and application. Prereq: Senior standing. F	This course will cover: entropy, asymptotic equipartition property, data compression, channel capacity, differential entropy, the Gaussian channel, an introduction to rate distortion theory and network information theory.	<b>415/615 Rural Society &amp; Emergency Management</b> 3
<b>485/685 Biomedical Engineering</b> 3	<b>751 Electromagnetic Theory and Applications</b> 3	Application of emergency management principles and procedures of disaster preparedness, mitigation, and response and recovery in the rural context.
Unified study of engineering techniques and basic principles in physiological systems. Focus on membrane biophysics, biological modeling, compartmental analysis, and systems control theory. Prereq: Senior standing. F	Theory of radiation, antenna characteristics, complex waves, potential functions and spectral domain methods for wave guides and cavities, and dispersive media. 3 lectures. S/2	<b>431/631 Disaster Response Operations and Leadership</b> 3
<b>487/687 Cardiovascular Engineering</b> 3	<b>755 Advanced Topics in Electromagnetics</b> 3	Principles and procedures related to emergency operations plans, warning, evacuation, search and rescue, mass casualty care, sheltering, donations management, disaster declaration, and incident debriefing.
This course includes the application of engineering techniques to cardiovascular physiology and medicine. Basic cardiac and vascular physiology will be presented, modeling techniques will be examined. Instrumentation, measurement theory, and assist devices will be discussed. Prereq: Senior standing. S	Topics of current interest in electromagnetics, microwaves, and optics. 3 lectures. Prereq: ECE 751. S/2	<b>451/651 Floods, Blizzards, and Tornadoes</b> 3
<b>701 Advanced Engineering Problem Solving</b> 3	<b>761, 763 Advanced Control Theory I, II</b> 3 each	Role of emergency management in floods, blizzards, and tornadoes; response of local, state, and federal governments and agencies to these conditions.
Application of advanced mathematical and computational methods to engineering problems. 3 lectures. S	State variable formulation of the control problem; system identification. Introduction to adaptive, distributed, multivariable, nonlinear, optimal, and stochastic control. Prereq: ECE 461, 761 respectively.	<b>453/653 Emergency Management Law and Regulation</b> 3
<b>702 Advanced Research Topics</b> 3	<b>774 Computer Architecture</b> 3	This course examines legal principles, policy and regulation that impact emergency management, including both the provision of care and services and the management of services. Prereq: PHIL 210.
Prepare the student in finding a major adviser; defining the research questions or objectives; beginning a literature search; learning how to prepare a manuscript and/or grant application with their major adviser. F	Processor operations, computer arithmetic, control mechanism, instruction sets, classification schemes, pipelining, parallel processing, hierarchical memory and memory management, I/O methods and interrupts, and interconnection buses. 3 lectures. Prereq: ECE 374.	<b>461/661 Business Continuity &amp; Crisis Management</b> 3
<b>703 Advanced Teaching and Classroom Topics</b> 1	<b>775 Hardware for Cryptography</b> 3	This course provides an overview of planning and management principles applicable to business or operational resumption following an emergency. The emphasis will be on minimizing the impact of a disaster on business operations.
To help prepare the Ph.D. student for the challenge of teaching in a classroom. F	This course covers the mathematical background, modern cryptographic techniques like block ciphers, hash functions and public-key cryptosystems. Hardware and embedded implementations of cryptosystems and recent research in hardware implementation are also covered. Prereq: CSCI 469/669, ECE 341, 423, 470.	<b>463/663 Voluntary Agency Disaster Services</b> 3
<b>721 Integrated Circuits</b> 3	<b>778 Computer Networks</b> 3	Examination of the roles played by local, state, national, and international voluntary agencies in emergency preparedness, mitigation, response, and recovery.
Introduction to CMOS circuits. Circuit characterization and performance estimation. CMOS circuit and logic design, CMOS testing. CMOS subsystem design. 3 lectures. Prereq: ECE 423/623.	Examination of computer networks using the ISO-OSI model as a framework. Exploration of practical and theoretical issues in modems, codes, error, impairments, modulation, protocols, and interfaces. 3 lectures. Prereq: CSCI 474. (alternate years)	<b>481/681 Disaster Analysis</b> 3
<b>723 Advanced Electronics</b> 3		Examination of natural and human-made disasters from a multidisciplinary perspective.
Characteristics and detailed modeling of operational amplifiers. Applications to waveform generation, analog multiplication, modulation, and data conversion. IC and special amplifiers. 3 lectures. Prereq: ECE 421/621. (alternate years)		

**483/683 Holistic Disaster Recovery 3**

Examination of post-disaster policies and programs that protect the natural environment, improve disaster resistance, support diverse populations, improve economic conditions, and preserve community resources.

**489 Capstone in Emergency Management 1**

Integrate course work taken in Emergency Management major; apply emergency management principles to real world events; and explore career and graduate options in the field of emergency management. Prereq: Senior standing.

**712 Hazards Risk Assessment Theory and Practice 3**

Examination of natural and human-made disasters from a risk assessment perspective, and preparedness and control procedures for each of these types of disasters.

**714 Hazardous Materials Regulation 3**

Hazardous materials contingency planning and environmental regulations at the community, state, and federal levels.

**720 Emergency Management Theory 3**

This course will discuss the origin and evolution of emergency management, the relevance of theory in this applied setting, and theory in the advancement of knowledge in social disasters and the emergency management specialization.

**721 [621] Hazard Mitigation Theory and Practice 3**

Examination of disaster mitigation theory and the rationale and context of mitigation procedures, programs, and planning. Students will acquire both theoretical and applied understandings of mitigation principles and practices. Prereq: EMGT 413/613.

**730 Advanced Research Methods 3**

This course will instruct students on applications and case studies of practical aspects of field research building upon traditional research topics as applied to disaster research. The course will analyze disaster case studies' research methodologies. Prereq: SOC 700, 701.

**732 Disaster Response Theory and Practice 3**

Examination of theory and practice in the relationship between incident command systems and emergency operating centers.

**782 Damage Recovery Theory and Practice 3**

Theory, principles, and procedures used in disaster damage assessment and in emergency supply and service dissemination.

**ENGINEERING (ENGR)**

Smith, Dean

**COURSES****111 Introduction to Engineering 1**

Designed to provide general engineering students with an opportunity to review, study, discuss, and evaluate various engineering professions as career choices. F, S

**310 Entrepreneurship for Engineers and Scientists 3**

How to turn a great idea into a business by starting a company and/or profiting from a new invention. Developing a product, conducting patent searches, securing intellectual property rights, writing a business plan, obtaining financing, etc. are covered. F

**311 History of Technology in America 3**

Development of tools, technology, and whole systems, especially the U.S. experience since 1700. Contributions of Jefferson, Richards, Edison and others as models of creativity as a foundation for the emergence of modern conceptions of progress.

**312 Impact of Technology on Society 3**

Study of the impact of technology on the natural environment; discussion of values, ethics, citizenship, social responsibilities, and the relationship of humans to the environment.

**320 Technical Communication 3**

Application of written and oral aspects of technical communication geared especially toward the engineering profession. Students create documents and presentations for a variety of audiences and purposes. 3 recitations. Prereq: ENGL 110. F, S

**402 Engineering Ethics and Social Responsibility 1**

Philosophical basis for ethical decisions, guidance for ethical decision making in engineering practice, ethics of social responsibility, professionalism, case studies, and codes of conduct for engineers. F, S

**489 Collaborative Engineering Capstone 3**

Integration of engineering and architecture topics and job functions projects. Students will plan, design, develop, verify, produce/construct/service facilities and systems created to fulfill industrial, agricultural, urban, and business needs. Prereq: Senior standing and major departmental approval. F, S

**715 Engineering Systems 3**

Interdisciplinary systems analysis approach to engineering problems. Mathematical and physical stochastic process and control systems.

**741 Systems—Linear and Nonlinear Concepts 3**

Nonlinear and linear programming methods for engineering design optimization. Formulation and optimization of design problems from all areas of engineering.

**762 Heat and Mass Transfer 3**

Theory and application of transport of heat and mass. Heat diffusion equation in several coordinate systems. Fourier series and transforms and Laplace transform techniques. Mass transfer examples. Introduction to simulations.

**770 Quantitative Modeling 3**

Applications modeling and optimization methods. Domains: transportation, logistics, manufacturing, service systems scheduling, and supply-chain management. Decision models: linear programming and sensitivity analysis, transportation and assignment, network models and algorithms, and integer, dynamic and nonlinear programming. Prereq: MATH 265.

**771 Probabilistic and Deterministic Methods 3**

Applications modeling. Domains include transportation, logistics, manufacturing, service systems scheduling, and supply-chain management. Quantitative models and tools include Markov chains, stochastic processes, queuing, deterministic and stochastic decision analysis, time series, forecasting, and regression modeling. Prereq: MATH 265, IME 460/660.

**780 Electromagnetic Theory 3**

Physical concepts and mathematical solutions of Maxwell equations; boundary conditions, force, and energy equations; potential equations; Green's

functions; wave equations, radiation, and propagation of electromagnetic waves. F/2

**789 Advanced Research Methods in Engineering 3**

Advanced study of the philosophy, reasoning, design, methods, and procedures employed in conducting and disseminating scientific research. Includes a survey of current and original research with interpretation and assessment.

**ENGLISH (ENGL)**

Sullivan, Head; Aune, Birmingham, Brooks, Brown, Cavins, Fricker, Helstern, Johnston, Krishnan, Martinson, Nichols, O'Connor, Peterson, Rupiper Taggart, Sandland, Scott, Shaw, Totten, Trump

**COURSES****110 College Composition I (CCN) 3**

Guided practice in college-level reading, writing, and critical thinking. Includes process writing and an introduction to library research. (ND:ENGL)

**111 Honors Composition I (CCN) 3**

Accelerated reading, writing, and critical thinking activities designed to enhance qualified students' well-developed skills of language use. Requires enrollment in the Scholars Program. Equivalent to ENGL 110. (ND:ENGL)

**112 ESL College Composition I (CCN) 4**

Guided practice in college level reading, writing, and critical thinking, with special attention to the issues of usage encountered by non-native speakers of English. Includes process writing and an introduction to library research. Equivalent to ENGL 110.

**120 College Composition II (CCN) 3**

Advanced practice in college-level writing from sources and in applying rhetorical strategies. Requires library research and use of summaries, paraphrases, and quotations from relevant sources in analysis and persuasion essays. Prereq: ENGL 110. (ND:ENGL)

**121 Honors Composition II (CCN) 3**

Accelerated practice in college-level writing for qualified students with skills in research and argumentation. Essays using library research and summaries, paraphrases, and quotations from relevant sources. Requires enrollment in the Scholars Program. Equivalent to ENGL 120. Prereq: ENGL 111. (ND:ENGL)

**122 ESL College Composition II (CCN) 4**

Guided advanced practice in college level writing from sources and in rhetorical strategies, with additional support related to higher level language acquisition and usage for non-native speakers of English. Equivalent to ENGL 120. Prereq: ENGL 112.

**167 Introduction to English Studies (CCN) 3**

An introduction to the different areas of English studies including literature, writing studies, and linguistics and the ways in which they are studied.

**209 Introduction to Linguistics (CCN) 3**

Entry-level knowledge for the scientific study of language, including such topics as phonetics, phonology, morphology, semantics, grammar, social and cultural dimensions, acquisition, variation and similarities among languages of the world, and related cultural history. Cross-listed with ANTH.

**213 Literary Publications (CCN) 3**

Theory and practice in the process of producing a literary magazine. Prereq: ENGL 120.

<b>220 Introduction to Literature (CCN)</b> 3	development and use for expert, business, and more general audiences. Prereq: ENGL 120, Junior standing.	<b>358 Writing in the Humanities and Social Sciences</b> 3	Theory and practice for writing multiple genres in the humanities and social sciences. Prereq: ENGL 120, Junior standing.
Reading and discussion of representative examples of poetry, drama, and fiction, with emphasis on the use of common literary terminology. Classic and contemporary works. Focus on enjoyment and appreciation of verbal art. (ND:HUM)		<b>360 Grammatical Structure</b> 3	Examines the system of the English sentence. Emphasis on structures and components with attention to application in teaching, stylistic analysis, and editing.
<b>222 Introduction to Poetry (CCN)</b> 3		<b>377 [477] Modern Poetry</b> 3	Experimentation and innovation in poetry from 1910 to 1945. American, English, and Irish poets, including such transnational writers as Eliot, Pound, H.D., D.H. Lawrence, and Auden. Prereq: ENGL 120.
Examination of poetic forms including the uses of figurative language and the techniques of rhythm and meter, as well as imagery and structure. Includes traditional and contemporary lyrics.		<b>380 Shakespeare</b> 3	Study of representative poetry, comedies, histories, and tragedies.
<b>225 Introduction to Film (CCN)</b> 3		<b>381 American Road Book</b> 3	A study of the American road narrative in cultural and historical contexts, including the rise of the automobile and tourism, the American dream, the frontier myth, race, class, and gender, and national and individual identity.
General introduction to film studies, including analysis of narrative and stylistic elements of films for their artistic merits and their reflection of an influence on society. (ND:HUM)		<b>382 Film Genres and Styles</b> 3	Study of one or more film genres, styles, or movements, focusing on aesthetic conventions, cultural context, socio-historical significance, and critical approaches. May be repeated with change of topic. Prereq: THEA 115 or ENGL 225 or 271.
<b>226 The Poetry of Rock (CCN)</b> 3		<b>385 British Fiction</b> 3	Examines significant works of British short and long fiction in terms of their cultural, social, and psychological content and their literary artistry.
Examination of rock lyrics as contemporary poems, using techniques of literary criticism to analyze their themes, their aesthetic principles, and their place in art and culture.		<b>389 Non-Fiction Prose</b> 3	Examines non-fiction prose in its various forms as a significant literary genre capable of exploring cultural, social, historical, psychological, and philosophical matters with logic, emotional power, and literary artistry.
<b>240 World Literature Masterpieces (CCN)</b> 3		<b>413 Literary Publications III</b> 3	Theory and practice in the process of producing a literary magazine. Prereq: ENGL 120.
Study of representative cultural and literary materials from the ancient world to modern times.		<b>423 Creative Writing Studio</b> 3	Advanced creative writing with an emphasis on the student as working writer. Readings in creative and/or critical texts and participation in community events. Intensive workshop discussion, with the goal of publishing a manuscript. Prereq: ENGL 275, 322, or 323.
<b>251 British Literature I (CCN)</b> 3		<b>450/650 Contemporary Linguistics</b> 3	Language characteristics (sound, structure, meaning, conversation), relation to culture, first and second language acquisition.
Survey of major works and writers in British literature from the Anglo-Saxon period through the 18 <sup>th</sup> century. (ND:HUM)		<b>451/651 Advanced English Grammar</b> 3	Systematic examination of the structures and processes that shape English sentences; development of skills to analyze why certain structures are more or less appropriate. Prereq: ENGL 450.
<b>252 British Literature II (CCN)</b> 3		<b>452/652 History of the English Language</b> 3	Development of the English language from its Germanic origins to the modern period.
Survey of major works and writers in British literature from the Romantic Age to the present. (ND:HUM)			
<b>261 American Literature I (CCN)</b> 3			
Survey of major works and writers in American literature from the colonial period through the Civil War. Emphasis on the development of unique American values and literature. (ND:HUM)			
<b>262 American Literature II (CCN)</b> 3			
Survey of major works and writers in American literature from the Civil War to the present. Includes traditional as well as experimental, innovative, and counter-cultural works and authors. (ND:HUM)			
<b>271 Literary Analysis (CCN)</b> 3			
Introduction to traditional and contemporary approaches in the study of literature and the fundamental skills required for the analysis of literary texts.			
<b>275 Introduction to Writing Studies (CCN)</b> 3			
A broad history of writing and rhetoric as well as an introduction to spheres of writing studies: creative, academic, professional/technical, and public writing. Prereq: ENGL 120.			
<b>313 Literary Publications II</b> 3			
Theory and practice in the process of producing a literary magazine. Prereq: ENGL 120.			
<b>320 Business and Professional Writing</b> 3			
Intensive practice employing the conventions of professional genres to write for business and professional contexts and audiences. Prereq: ENGL 120, Junior standing.			
<b>321 Writing in the Technical Professions</b> 3			
Intensive practice employing the conventions of professional genres to write about technology			
	<b>322 Creative Writing I</b> 3		
	Imaginative writing with an emphasis on exploring multiple genres, developing critical awareness, and becoming acquainted with the literary fine arts. Prereq: ENGL 120.		
	<b>323 Creative Writing II</b> 3		
	Imaginative writing with a concentration in one or two genres. Emphasis on developing critical awareness and becoming acquainted with the literary fine arts. Prereq: ENGL 120.		
	<b>324 Writing in the Sciences</b> 3		
	The study and practice in written conventions of the sciences for academic, scientific, and public audiences. Prereq: ENGL 120.		
	<b>330 British and American Women Writers</b> 3		
	Investigation of the literary portrayal of women and its effects on society. Some consideration of problems specific to women writers.		
	<b>331 Contemporary Women Writers</b> 3		
	Study of the language, imagery, themes, and genres in 20 <sup>th</sup> century literature by women of various cultural, ethnic, and national backgrounds.		
	<b>333 Fantasy and Science Fiction</b> 3		
	Study of social and psychological implications of fantasy literature and works of fiction concerned with the impact of science and technology on the human imagination.		
	<b>335 Multicultural Writers</b> 3		
	Major literary figures within and outside the United States. Includes Asian, Mexican, and Canadian, as well as Native-American, Black, Asian-American, and Chicano writers.		
	<b>336 Literature and the Environment</b> 3		
	Milestones of American writing about nature and culture from Thoreau to the present. Reading and analysis of literary encounters with place and issues that arise when the local is global. Prereq: ENGL 120.		
	<b>340 19<sup>th</sup> Century American Fiction</b> 3		
	Selected fiction reflecting problems and ideas, emphasizing the shift from romanticism to realism and naturalism, of the 19 <sup>th</sup> century. Representative writers: Cooper, Hawthorne, Twain, Jewett, James, and Wharton, and includes minority voices.		
	<b>341 20<sup>th</sup> Century American Fiction</b> 3		
	Selected fiction reflecting social, psychological, and literary trends in the 20 <sup>th</sup> century. Includes multicultural and women authors, as well as experimentations in genre.		
	<b>345 Themes in American Culture</b> 3		
	A multidisciplinary approach, including art, music, and literature, to various eras and themes in American cultural history.		
	<b>357 Visual Culture and Language</b> 3		
	This course will cover the rise of visual culture and the impact this historical shift has made on print culture and writing. Students will produce information graphics, photo essays, videos, and other genres. Prereq: ENGL 120.		

<b>453/653 Social and Regional Varieties of English</b> 3	<b>482/682 Renaissance Literature</b> 3	<b>780 Studies in British Literature</b> 3
Study of sociological factors as they relate to language (American English). Examines region, age, gender, ethnicity, self-identity, situation, profession, etc. and their relation to pronunciation, word choice, politeness, formality, turn-taking, etc. Students conduct original research.	Study of British writers of the 16 <sup>th</sup> and 17 <sup>th</sup> centuries.	Intensive study of a special period, theme, technique, or group of writers central to the formation, development, or flowering of British literature. May be repeated with change of topic.
<b>454/654 Language Bias</b> 3	<b>483/683 Topics in British Literature</b> 3	<b>ENTOMOLOGY (ENT)</b>
Application of current linguistic, rhetorical, and literary theory to examine and analyze the ways in which the social asymmetries of gender, sexuality, race, and ethnicity are reflected and sustained through discourse practices.	Intensive study of a special theme, form, period, or group of writers central to the formation of British literature. May be repeated with change of topic.	Boetel, Foster, Harris, Knodel, Ode, Olson, Rider
<b>456/656 Literacy, Culture, and Identity</b> 3	<b>485/685 18<sup>th</sup> Century Literature</b> 3	<b>COURSES</b>
Reading, writing, research, and discussion of diverse types of literacy from functional to cultural to technological and their roles in culture and identity formation. Completion of related community projects. Prereq: ENGL 120, Junior standing.	Study of major writers: Dryden, Pope, Swift, and Johnson, with occasional excursions into the fictional territory of Richardson, Fielding, Sterne, and Smollett.	<b>210 Insects, Humans, and the Environment</b> 3
<b>457 Electronic Communication</b> 3	<b>486/686 Romantic Literature</b> 3	Insect biology and its relevance to humans and the environment. 2 lectures. S (ND:SCI)
This web-based class will explore issues related to electronic communication through selected readings, projects that allow students to develop skills and insight through experiential learning, and though reflection on the dynamics of online education itself. Prereq: ENGL 120.	Study of major British writers from the French Revolution to the coronation of Queen Victoria.	<b>350 General Entomology</b> 5
<b>458 Advanced Writing Workshop</b> 3	<b>753 Rhetorics &amp; Poetics of New Media</b> 3	Fundamental aspects of insect structure, classification, and biology with sections emphasizing horticultural entomology, agronomic crop protection, insect ecology, and aquatic entomology. 3 lectures, 1 three-hour laboratory. F
Writing, revising, and editing projects based on rhetorical principles. Frequent response from peers and instructor. Analysis of selected readings and students' own writing. Prereq: ENGL 358.	This web-based class will provide in-depth study of major new media theorists and require students to consider the research and teaching implications of new media for the humanities and social sciences.	<b>360 Economic Entomology</b> 1-3
<b>459/659 Researching and Writing Grants and Proposals</b> 3	<b>754 Rhetorics of Science and Technology</b> 3	A distance education course covering agronomic and horticulture insect pests including impact of insects, introduction to IPM, pest management tools, and insect vectors of diseases. May be repeated for 1 credit if previously taken for 2 credits. Prereq: BIOL 151. F
A rhetorical approach to researching and writing academic grants, business proposals, and related professional documents. Students develop a portfolio of professionally designed and edited documents as well as the vocabulary of grants writing and research. Prereq: Junior standing.	The study and critique of the rhetorics of science and technology, informed by rhetorical theory and by the philosophy of and the social studies of science and technology.	<b>410/610 Management of Pests</b> 3
<b>467 English Studies Capstone Experience</b> 3	<b>755 Composition Theory</b> 3	How pests are managed and influenced by the environment, society, economics, and pest biology. This class will look at these factors and how they affect pest management practice across taxonomic groups. Prereq: BIOL 151, ENT 350, PPTH 324, PLSC 323. S (even years)
Cumulative and integrative study for English majors of English language, literature, and composition. Prereq: ENGL 271.	Study of contemporary theories of teaching writing with frequent summary/response papers on assigned readings and a research paper on composition theory.	<b>731 Principles of Integrated Pest Management</b> 3
<b>471/671 American Realistic Literature</b> 3	<b>756 Composition Research</b> 3	Principles embodied in the implementation of multifaceted tactics designed to successfully manage pest populations. Prereq: ENT 350, STAT 330. S (even years)
Principles of American literary realism as exhibited in the major works of Howells, James, Twain, Crane, Chopin, Gilman, Norris, Wharton, Dreiser, and others. Combination varies.	Study of designs and basic statistics for writing research; analysis of current research; and a research project in composition.	<b>732 Plant Resistance to Insects</b> 2
<b>472/672 20<sup>th</sup> Century American Writers</b> 3	<b>757 Composition Studies</b> 3	Plant/insect interactions and their applications to plant breeding to increase resistance to pests. Prereq: ENT 350. F (even years)
Intensive study of major American writers from 1900 to 1950.	Overview of major areas in composition studies (rhetoric and composition, theory and practice, research, and instructional trends).	<b>742 Quantitative Biology</b> 3
<b>474/674 Native American Literature</b> 3	<b>758 Topics in Rhetoric and Writing</b> 3	Philosophy and techniques for collecting, handling, and interpreting research data in the biological sciences. Prereq: STAT 330. Cross-listed with BIOL.
The development of literature by and about Native Americans is traced from 1850 to the present. Focus on Native American identity and contributions to the American culture.	Intensive study of a theory, theorist, or issue in rhetoric or writing with regard to relevance for critical and production practices in English studies. May be repeated with change of topic.	<b>750 Systematic Entomology</b> 5
<b>476/676 Topics in American Literature</b> 3	<b>759 History of Writing Instruction</b> 3	Introduction to systematic methods and principles; identification of common families of insects. Prereq: ENT 350. F (even years)
Intensive study of a special theme, form, period, or group of writers central to the formation and development of American literature. May be repeated with change of topic.	The study of the history of writing instruction from antiquity to the present, with emphasis on relevance to modern writing instruction.	<b>751 Immature Insects</b> 3
<b>480/680 Medieval Literature</b> 3	<b>760 Graduate Scholarship</b> 3	Characteristics of the immature forms of the orders and principal families of insects. Prereq: ENT 750. F (odd years)
British poetry and prose from the beginning of the Middle Ages to 1500, excluding Chaucer.	Introduction to scholarship in English studies and to the nature and state of the discipline.	<b>760 Insect Structure</b> 4
	<b>762 Critical Theory</b> 3	Structure of insects and physiological functions. The development of adult form from embryonic and larval precursors during growth and metamorphosis; evolutionary development of insect structures. Prereq: ENT 350. F (odd years)
	Study of contemporary literary theory and criticism.	<b>761 Insect Physiology</b> 4
	<b>764 Classroom Strategies for TA's</b> 3	Function of major insect organ systems and metabolism, growth, and molting of insects. Prereq: ENT 350, CHEM 260. S (odd years)
	Introduction to current issues in composition pedagogy, research, and theory, focusing on how they inform teaching practices. Instruction on developing philosophy of and strategies for teaching through short position papers, literacy autobiography, and a sequence of assignments for ENGL 120.	
	<b>770 Studies in American Literature</b> 3	
	Intensive study of a special period, theme, technique, or group of writers central to the formation, development, or flowering of American literature. May be repeated with change of topic.	



**765 Biological Control of Insects and Weeds** 3  
The natural or applied regulation of pests by predaceous and parasitic insects and pathogens. Prereq: ENT 350. F (odd years)

**770 Insect Ecology** 3  
Role of insects in ecological communities. Emphasis on the importance of insects in development of ecological concepts and as primary herbivores, which provide an interface between plant and animal ecology. Prereq: ENT 350, STAT 330. S (even years)

## ENVIRONMENTAL AND CONSERVATION SCIENCES (ECS)

Saini-Eidukat

### COURSES

**740 Environmental Management** 3  
Regional and global environmental issues, policies, and regulations. Integrated approach to control and prevention of environmental degradation. Methods for environmental data collection, analysis, and management. Environmental modeling. Environmental risk assessment, feasibility study, and decision making.

**750 Environmental Decision Analysis** 3  
This course will teach students quantitative methods for analyzing problems involving uncertainty and multiple, conflicting objectives. Topics include subjective probability, utility, value of information, and multiple attribute methods. Students will apply these tools to current environmental problems. Prereq: Statistics course.

**760 Environmental Impact Assessment** 3  
Analysis of environmental protection legislation, biological, physical and socioeconomic impacts. National Environmental Policy Act (NEPA) and related regulations. Prereq: ECS 750.

**770 Environmental Law and Policy** 3  
Introduction of major federal and state statutes and regulatory programs that governs environmental quality, pollution control and wildlife management, including legislative enactment, regulatory development, enforcement, federal/state relationship and judicial interpretation.

## ENVIRONMENTAL DESIGN (ENVD)

Scott, Wischer

### COURSES

**101 [ARCH/LA 171] Introduction to Environmental Design** 3  
Introduction to the environmental design fields of city planning, urban design, landscape architecture, architecture, and interior design. Particular attention is given to basic design concepts, visualization, visual analysis, imagination, and creativity.

**130 Drawing for Environmental Designers** 3  
Introduction to traditional freehand methods of graphic exploration as employed in architecture and landscape architecture. Prereq: ENVD 101.

**172 [ARCH/LA] Environmental Design Fundamentals** 4  
Introduction to design studio, with practice in representational media, techniques and skills exploring drawing, visual abstraction, visual literacy relating to

environmental design problem-solving, visual resolution of form and proportion, and graphic communication. Prereq: ENVD 101.

## FOOD SAFETY (SAFE)

Freeman, Director; Hall, Wolf-Hall

### COURSES

**450/650 Food Safety for the Food Industry and Consumers** 3  
A brief overview about food safety hazards, followed by discussions of sanitation, handling, processing, and serving food leading to explanation of Quality Assurance Programs at the farm and HACCP in food processing and food service. S

**452/652 Food Laws and Regulations** 3  
Regulations, laws, and dynamics governing development of food policy. Prereq: SAFE 470. Cross-listed with CFS and AGECE. S

**464/664 Etiology/Foodborne Illness** 3  
Study of the etiology, prevention, pathogenesis, and disease manifestations of foodborne illnesses, including those caused by pathogens, allergens, toxins, and contaminants, detection of the etiologic agents, and their entrance into the food chain. Prereq: MICR 202, 202L. Cross-listed with MICR. F

**470/670 Economic Epidemiologic and Regulatory Issues in Food Safety** 3  
The study of the economic impact of foodborne illness and its prevention and tracking, and the regulations governing food safety in the U.S. and their impact on global trade. Prereq: STAT 330. S

**474/674 Epidemiology** 3  
Study of the distribution and dynamics of disease in populations. Prereq: STAT 330. Cross-listed with MICR. S

**484/684 Food Safety Practicum** 2  
An integrated, laboratory study of food safety. Field trips, specialty speakers, workshops, and case studies will be used to foster students' abilities to solve food safety problems from farm to fork. Prereq: SAFE 450, 464, 470. Cross-listed with MICR. SS

**485 Crisis Communication** 3  
See Communication for description.

**486 Capstone Experience in Food Safety** 2  
Integration of principles of food safety with the development of skills in solving food safety problems. Prereq: Senior standing.

**720 Food Safety Costs and Benefits Analysis** 3  
Theoretical and empirical impacts of food safety costs and benefits. Prereq: SAFE 470/670, AGECE 741. Cross-listed with AGECE.

**725 Food Policy** 3  
Provides quantitative tools and models used to analyze general food safety policies. Prereq: SAFE 470/670. Cross-listed with AGECE and CFS.

**750 Advanced Topics in Epidemiology** 3  
Distribution and dynamics of disease in populations, and factors contributing to the costs of foodborne illness and its prevention. Three lectures. Prereq: SAFE 474/674. Recommended: MICR 460. Cross-listed with MICR.

**752 Advanced Food Microbiology** 3  
State-of-the-art techniques in isolation, detection, and characterization of food-borne pathogens. Prereq: MICR 653. Cross-listed with CFS and MICR.

**753 Food Toxicology** 2  
Discussions on the properties of toxic substances found both naturally and as contaminants in foods, the hazards they present to humans and their food supplies, and ways to reduce risks. Prereq: BIOC 460. S (even years)

**762 Advanced Pathogenic Bacteriology** 3  
See Microbiology for description.

**785 Advanced Crisis Communication** 3  
Long- and short-term issues for managing communication related to organizational crises are discussed in the stages of pre-crisis, crisis and post-crisis. Cross-listed with COMM.

**786 Risk Communication** 3  
Explores the relationship between communication strategies and risk perception, assessment, and management. Cross-listed with COMM.

## FRENCH (FREN)

Homan, Chair; Hageman, Saar

### COURSES

**101, 102 First-Year French I, II (CCN)** 4 each  
Basic structures and vocabulary of French. Practice in the fundamentals of listening, speaking, reading, and writing. No previous knowledge of French required. (ND:HUM)

**201, 202 Second-Year French I, II (CCN)** 3 each  
Emphasis on developing proficiency in the four language skills. Review of grammar, practice in composition, and cultural and literary readings. Prereq: FREN 102. 201: (ND:HUM)

**311, 312 French Conversation and Composition I, II** 3 each  
Advanced practice to develop greater proficiency in oral and written skills through the study of cultural and literary readings. Prereq: FREN 202.

**315 Introduction to French Civilization** 3  
Introduction to the political, social, and cultural history of France. Includes important schools of art, music, and architecture. Taught in French. Prereq: FREN 312.

**350 Introduction to French Linguistics and Pronunciation** 3  
Study of the basic nature and function of languages as applied to French. Application of principles of phonetics to the pronunciation of the French language, plus extended practice in diction and intonation. Prereq: FREN 312.

**380 Women in French Literature** 3  
Study of works by French women writers of different literary periods; portrayal of women by French male and female authors. Taught in English.

**381 Masterpieces of French Literature in Translation** 3  
Designed for those with no background in French. Introduction to important writers of several periods. Taught in English. Does not count toward a French major or minor.

**410 French Literature to 1600** 3  
From La Chanson de Roland, courtly romances, and early poetry and theatre to Rabelais, the Pleiade, and Montaigne. Taught in French. Prereq: FREN 312.

**411 17<sup>th</sup> and 18<sup>th</sup> Century French Literature** 3  
Literature of le grand siècle, the Enlightenment, and the pre-Revolutionary years. Taught in French. Prereq: FREN, 312. (alternate years)

**412 19<sup>th</sup> and 20<sup>th</sup> Century French Literature** 3  
From 19<sup>th</sup> century Romanticism, Naturalism, and Symbolism to the literature of modern France. Taught in French. Prereq: FREN 312. (alternate years)

**489 Senior Thesis** 1-6  
Capstone experience option. Research and original investigation under the guidance of a faculty member. Student work to be written in French.

## GEOGRAPHY (GEOG)

Saini-Eidukat, Chair; Oduor

### COURSES

**151 Human Geography (CCN)** 3  
Non-ethnocentric understanding of geography of human lifestyles and activities; their place and role in human-environment interaction. (ND:SS)

**161 World Regional Geography (CCN)** 3  
Study of geographic processes shaping major world regions and inter-relationships in the global village; geographic bases and implications of current world events. (ND:SS)

**262 Geography of North America (CCN)** 3  
Spatial approach to the development of the United States and Canada, which stresses changing cultural landscapes and assessing impacts of planning for resource utilization.

**412/612 Geomorphology** 3  
See Geology for description.

**455/655 Introduction to Geographic Information Systems** 3  
Application of the principles of geographic information systems and integrally related mapping to solve problems related to environment site characterizations, resource exploration, soil and groundwater contamination, geological and geotechnical investigations, waste management, construction, etc. Comprehensive lab assignments included to give students hands-on experience solving problems with current state-of-the-art software and hardware, digitizers, scanners, and GPS units.

**456/656 Advanced Geographic Information Systems** 3  
Application and analysis of advanced techniques and principles of geographic information systems and remote sensing technologies to fully address spatial and time related problems related to urban site characterizations, hydrologic analyses, risk assessment, policy making, disaster response and strategic defense techniques. Comprehensive lab assignments included to give students hands-on experience solving problems with current state-of-the-art software and hardware, digitizers, scanners, and GPS units. Prereq: GEOG 455/655.

## GEOLOGY (GEOL)

Saini-Eidukat, Chair; Ashworth, Hatzenbuhler, Lepper, Oduor, Schwert

### COURSES

**105, 105L Physical Geology, Lab (CCN)** 3,1  
Study of the Earth as a physical body; its structure, composition, and the geologic processes acting on and within the Earth. (ND:LABSC)

**106, 106L The Earth Through Time, Lab (CCN)** 3,1  
Introduction to the Earth through time; its origin, history, and evolution of animal and plant life. (ND:LABSC)

**300 Environmental Geology** 3  
Human interaction with Earth's environment. Earthquakes, floods, volcanoes, landslides, water use, pollution, energy, mining, and land-use planning. Prereq: GEOL 105, 105L. (alternate years)

**301 Lake Superior Field Course** 2  
Stratigraphy, mineralogy, and economic geology of northern Minnesota and northwestern Ontario. Weekly lecture, plus six-day field excursion. Offered periodically. Fee required. Prereq: GEOL 105, 105L, 106, 106L.

**302 Black Hills Field Course** 2  
Stratigraphy, structure, and mineralogy of the Black Hills and Williston Basin. Weekly lectures, plus seven-day field excursion. Offered periodically. Fee required. Prereq: GEOL 105, 105L, 106, 106L.

**303 Paleontology Field Course** 1  
Paleozoic stratigraphy and paleontology of southeastern Minnesota and northern Iowa. Lecture by arrangement, 1 three and one-half day field excursion. Fee required. Prereq: GEOL 106, 106L. (alternate years)

**304 Eastern North Dakota Field Course** 1  
Field study of Mesozoic and Cenozoic sediments of eastern North Dakota. Two-day field excursion and a report. Fee required. Prereq: GEOL 105 or 106.

**350 Invertebrate Paleontology** 3  
Survey of invertebrate fossils emphasizing systematics, environments and as stratigraphic markers. Offered periodically. Prereq: GEOL 106, 106L.

**410 Sedimentology/Stratigraphy** 4  
Origin and classification of sedimentary rocks and their stratigraphic relationships. 3 lectures, 1 laboratory. Prereq: GEOL 105, 105L, 106, 106L. (alternate years)

**412/612 Geomorphology** 3  
Land forms and the processes by which they are formed and modified. Prereq: GEOL 105, 105L. Cross-listed with GEOG.

**413/613 Glacial Geology** 3  
Glaciers as agents of geologic change; evolution of landforms and landscapes shaped by glaciers; glaciers and glacial landscapes as records of global climate and environmental change; glacial history of North America. Prereq: GEOL 105, 105L. (alternate years)

**414/614 Hydrogeology** 3  
Concepts of surface and groundwater hydrogeology in natural systems; the hydrologic cycle; physical properties of aquifers and subsurface flow; open channel flow; aqueous geochemistry. Prereq: GEOL 105, MATH 147 or 166, CHEM 122 or 161. (alternate years)

**420/620 Mineralogy** 4  
Crystal forms, crystal chemistry, and formation of non-silicate and silicate minerals. Prereq: CHEM 121 or 150. (alternate years)

**421/621 Mineralogy Laboratory** 2  
Identification and classification of minerals using morphology, physical properties, XRF and XRD. Coreq: GEOL 420/620. (alternate years)

**422/622 Petrology** 4  
Principles of igneous and metamorphic petrology including geochemistry, phase relations, and rock forming processes. Prereq: GEOL 420/620. (alternate years)

**423/623 Petrography** 2  
Identification and classification of rocks in hand specimens and thin sections. Optical mineralogy. Field and laboratory projects required. Coreq: GEOL 422/622. (alternate years)

**428/628 Geochemistry** 3  
Introduction to geochemistry: chemistry of the Earth, groundwater, isotopes, global geochemical cycles, geochemical modeling, and environmental geochemistry. Prereq: CHEM 121 or 150. Cross-listed with CHEM. (alternate years)

**440/640 Quaternary Biology** 4  
Biotic responses to climatic changes; the role of adaptation, extinction, and dispersal in response to the climatic changes of the Quaternary. 2 lectures, field and laboratory studies. Prereq: GEOL 106, 106L. (alternate years)

**450/650 Field Geology** 3  
Interpretation of geology in the field; preparation of base maps and plotting geological data. Lectures, one-week fieldwork, and report. Fee required. Prereq: GEOL 410, 421/621, 423/623, 457/657. (alternate years)

**457/657 Structural Geology** 4  
Dynamics of rock deformation and analyses of Earth structure. Prereq: GEOL 105, 105L, MATH 105. (alternate years)

**460/660 Biogeochemistry** 3  
An overview of how life affects Earth's chemistry, examining interactions between the atmosphere, the land surface, and the oceans. Biotic mechanisms will be followed via the global cycles of biologically relevant elements stressing human impacts. Offered periodically. Prereq: GEOL 105, 105L, 106, 106L, CHEM 121, 122, BIOL 150, 151.

**760 Advanced Biogeochemistry** 3  
Examines the nature of the interaction between Earth's biogeochemical cycles and climate and how this interaction has evolved over time and will change in the future. Offered periodically. Prereq: GEOL 460/660.

## GERMAN (GERM)

Grollman

### COURSES

**101, 102 First-Year German I, II (CCN)** 4 each  
Basic structures and vocabulary of German. Practice in the fundamentals of listening, speaking, reading, and writing. No previous knowledge of German required. (ND:HUM)

**201, 202 Second-Year German I, II (CCN)** 3 each  
Emphasis on developing proficiency in the four language skills. Review of grammar, practice in composition, and cultural and literary reading. Prereq: GERM 102. 201: (ND:HUM)

**311, 312 German Conversation and Composition I, II** 3 each  
Advanced practice to develop greater proficiency in oral and written skills through the study of cultural and literary readings. Prereq: GERM 202.

## HEALTH, NUTRITION AND EXERCISE SCIENCE (HNES)

Strand, Head; Albrecht, Ary, Barney, Barnhart, Craw, Deutsch, Edwards, Garden-Robinson, Hadley, Hansen, Liguori, Maughan, McLeod, Rhee, Stastny, Terbizan, Winters

### COURSES

**HPER 100 Concepts of Fitness and Wellness (CCN)** 2  
Facts about exercise and physical fitness.

**110 Introduction to Health, Nutrition and Exercise Sciences** 1  
Introduction to career opportunities and requirements within the profession. Investigation of the various majors in health, physical education, athletic training, human performance and fitness, nutrition, recreation and sport management. Coreq: HNES 150, 160, 170, 180, or 190.

**111 Wellness** 3  
Examination of personal lifestyle choices related to emotional, nutritional, and mental well-being. 3 lectures.

**112 Activity II** 1  
Basic techniques and practice of individual and dual sports activities.

**113 Activity III** 1  
Basic techniques and practice of team sports.

**114 Racquetball** 1  
Basic techniques and practice of racquetball.

**115 Bowling** 1  
Basic techniques and practice of bowling.

**117 Judo** 1  
Basic techniques and practice of judo.

**118 Tae Kwon Do II** 1  
See department for description.

**119 Beginning PADI Open Water Scuba** 2  
Beginning level scuba skills.

**120 Swimming I** 1  
Technique and practice in Levels I-IV of the American Red Cross Swimming Program.

**121 Swimming II** 1  
American Red Cross Level V-VII advanced level swimming techniques and practice.

**122 Advanced PADI Open Water Scuba** 2  
Advanced level scuba skills.

**125 Folk and Square Dance** 1  
Basic techniques and practice of folk dances of selected countries.

**126 Social Dance** 1  
Basic techniques and practice of social and ballroom dance forms such as foxtrot, waltz, jitterbug, polka, schottische, and Latin American dances.

**129 Aerobic Dance** 1  
Basic techniques and practice in aerobic exercise and dance activities.

**141 Food Sanitation** 1  
Principles of safe food handling practices designed for foodservice operators, CD-ROM format. Includes Food Safety Managers' Certification.

**150 Foundations of Physical Education** 2  
Introduction to developing a conceptual framework for teaching physical education. Includes an overview of the preparation needed and what is expected of physical education teachers. Coreq: HNES 110.

**154 Professional Preparation in Elementary School Activities** 3  
Instruction of various fundamental movements for elementary aged students. Students will be exposed to such activities as dance, gymnastics, fundamental movement skills, and games. Prereq: HNES 110, 150.

**160 Foundations of Health Professions** 2  
Introduction to health education and health promotion that examines the professional activities and competencies required for successful practice in the field. Coreq: HNES 110.

**170 Introduction to Human Performance and Fitness** 2  
Discussion of human performance and fitness as a career. Fundamentals include aerobic systems, strength, flexibility, and exercise prescription. Coreq: HNES 110.

**180 Athletic Trainers' Profession** 2  
Overview of athletic training and preparation required. Investigation of various career opportunities within the profession. Coreq: HNES 110.

**181 Practical Applications of Taping, Protective Devices, and Equipment** 3  
Practical exposure to evaluation, application and construction of; protective devices, taping techniques and equipment safety modifications for use in the athletic training setting. Prereq: BIOL 220, 220L.

**190 Introduction to Sport and Recreation Studies** 2  
This course is designed to introduce sport and recreation studies majors to the foundations and underlying principles of sport and recreation management. Prereq: HNES 110.

**HPER 200 Introduction to Parks and Recreation (CCN)** 2  
Introduction to the professions in leisure studies and community recreation. Coreq: HNES 110.

**210 Human Sexuality** 3  
See Psychology for description.

**HPER 210 First Aid and CPR (CCN)** 2  
Instruction and laboratory practice in first aid procedures, including CPR; healthy life styles; prevention. American Red Cross and American Heart Association standards.

**211 Successful Coaching** 1  
This course is designed to help potential coaches develop a successful coaching philosophy. Students will

complete an examination through the American Sport Education Program that will certify them to coach in 35 states.

**212 Psychological Aspects of Drug Use and Abuse** 3  
See Psychology for description.

**HPER 217 Personal & Community Health (CCN)** 3  
Study of vital personal and community health issues. Particular attention to current health facts, habits, and attitudes as they relate to home, school, and community.

**220 Lifeguard Training** 2  
American Red Cross techniques and methods of aquatic safety and lifeguarding. Meets American Red Cross standards.

**224 Event Management in Sport** 3  
An introductory course in event management that will provide students the opportunity to investigate the facilitation of events in the sporting environment. Prereq: HNES 190.

**225 Camp Management and Outdoor Recreation Skills** 3  
Principles and practices in camp management and counseling. Camping skills, activities and techniques.

**226 Introduction to Therapeutic Recreation** 3  
Survey of serving special populations, therapeutic recreation models, processes, rationales, terminology, and professional issues.

**230 Sports Officiating** 1  
Rules and techniques of officiating selected sports.

**240 Emergency Response** 3  
First aid and CPR certification through the American Red Cross; AED training, transporting the injured/ill athlete for further medical care.

**NUTR 240 Principles of Nutrition (CCN)** 3  
Current nutrition facts and philosophy as a basis for meeting nutritional needs in a changing society.

**250 Nutrition Science** 3  
Scientific principles of nutrition based on chemical structure and function of the nutrients. Prereq: CHEM 117 or 121.

**251 Nutrition, Growth, and Development** 3  
Examination of growth and nutrient needs through the lifecycle. Prereq: NUTR 240 or HNES 250.

**253 Motor Learning and Performance** 3  
Study of the principles of motor learning and development and how those principles apply in physical education and sport skill development. Prereq: HNES major or minor.

**255 [152] Professional Preparation in Middle School Physical Education** 3  
Instruction of various fundamental movement for middle school students. Students will be exposed to such activities as team sports, intermediate movement skills, and games. Prereq: HNES 110, 150.

**256 [153] Professional Preparation in High School Physical Education** 3  
Instruction in the fundamentals of teaching high school physical education activities. Prereq: HNES 110, 150.

**260 Athletic Training Medical Terminology** 1  
Medical terminology related to athletic training and other allied health professions.

<b>261 Food Selection and Preparation Principles</b> 3	<b>326 Recreation Programming</b> 3	<b>354L Introduction to Medical Nutrition Therapy Laboratory</b> 2
Scientific principles underlying food selection, preparation, and preservation; integration of nutrition principles, food standards, cost comparisons, and new food developments. Prereq: CHEM 117 or 121.	Principles of the process for designing leisure experiences. Art, crafts, music, dance, sport and games, special events, and environmental activities are examined. Risk management, intramural sports organization and program budgeting are stressed. Prereq: HPER 200.	Supervised practice in dietetics in a health care setting. 1 four-hour laboratory. Prereq: HNES 251, 351. Coreq: HNES 354.
<b>261L Food Selection and Preparation Principles Laboratory</b> 2	<b>330 Coaching Football</b> 2	<b>355 International Health</b> 3
Illustrates and extends lecture topics and stresses practical application of scientific food preparation principles. Coreq: HNES 261.	Rules, theory, principles, and fundamentals of coaching football. Prereq: Knowledge of the sport.	Introduction to the interrelationship of health and international affairs focusing on health as an issue of international relations and the technical and financial cooperation for health and the development.
<b>270 Consumer Issues in Food and Nutrition</b> 3	<b>331 Coaching Basketball</b> 2	<b>361 Food Production Management</b> 3
Current developments in food and nutrition recommendations and consumer related concerns.	Rules, theory, principles, and fundamentals of coaching basketball. Prereq: Knowledge of the sport.	Principles and methods of purchasing, production, and management for quantity foodservice operations. Prereq: HNES 261, 261L.
<b>271 Techniques of Strength and Conditioning</b> 3	<b>332 Coaching Track and Field</b> 2	<b>361L Food and Production Mgmt Laboratory</b> 2
The course presents strength training and conditioning theory and practice. Explored are principles of strength and conditioning, mastery and analyses of different exercises, and program design and implementation for general/athletic/special populations.	Rules, theory, principles, and fundamentals of coaching track and field. Prereq: Knowledge of the sport.	Principles and methods of purchasing, production, and management for quantity food service operations. Coreq: HNES 361.
<b>272 Techniques of Cardiovascular Conditioning</b> 3	<b>333 Coaching Wrestling</b> 2	<b>365 Kinesiology</b> 3
Understanding the techniques of conditioning the cardiovascular system. Types of conditioning explored: walking, jogging, spinning, aerobic dance, step aerobics, bench programming, cardio-kickboxing, TaeBo, and other popular types of programming.	Rules, theory, principles, and fundamentals of coaching wrestling. Prereq: Knowledge of the sport.	Study of movement analysis with emphasis on anatomical and movement principles. Prereq: BIOL 220, 220L, 221, 221L.
<b>276 Professional Observation</b> 1	<b>334 Coaching Baseball and Softball</b> 2	<b>367 Principles of Conditioning</b> 3
Observation in a setting providing established health-fitness services. Prereq: HNES 170, 272.	Rules, theory, principles, and fundamentals of coaching baseball and softball. Prereq: Knowledge of the sport.	Scientific theory and application of principles and techniques of physical conditioning to optimize training programs. Introduction of a wide variety of sports activities and associated training protocols. Prereq: BIOL 220, 220L.
<b>280 Sport Safety Training</b> 3	<b>335 Coaching Volleyball</b> 2	<b>368 Biomechanics of Exercise</b> 3
Basic first aid and CPR skills and information needed to care for sports related injuries.	Rules, theory, principles, and fundamentals of coaching volleyball. Prereq: Knowledge of the sport.	Study of the application of the principles of biomechanics and physics to human movement. Prereq: HNES 365.
<b>281 Injury Recognition and Evaluation of the Lower Extremity</b> 3	<b>336 Methods of Coaching</b> 3	<b>370 Activity Benefits and Exercise Prescription in Disease</b> 3
Injury recognition, treatment, management and evaluation of the lower extremity. Prereq: BIOL 220, 220L, 221, 221L.	Provides information necessary to coach at any level from elementary to college. Includes broad overview of the philosophy, methodology, and management of sport.	Focus on the role of physical activity in the development and treatment of chronic/metabolic diseases, with description of exercise interventions. Prereq: HNES 271, 272.
<b>282 Athletic Training Terminology and Equipment</b> 2	<b>341 Psychosocial Aspects of Health</b> 3	<b>371 Fitness Programming and Management</b> 2
Medical terminology related to athletic training and proper methodology used in the fitting, maintenance, and operation of athletic training equipment. Prereq: HNES 181.	Study of the interaction of the person and his/her environment. Discussion of emotional states, physiological responses and behaviors influencing a person's health, and the health of those around them. Prereq: PSYC 111.	Implementing various types of health and fitness programs focusing on worksite health promotion programming. Prereq: HNES 271, 272.
<b>284 Clinical Experience I</b> 1	<b>345 Materials and Concepts of Health Education</b> 3	<b>381 Injury Recognition and Evaluation of the Upper Extremity</b> 3
Clinical proficiencies and clinical experience hours. Prereq: Admission into Athletic Training Education program. .	Development and dissemination of health content helping community and school health educators place health instruction in a perspective that relates it to efforts aimed at protecting and promoting the health of children, youth and adults. Prereq: HPER 217, HNES 160, health major or minor.	Injury recognition, treatment, management and evaluation of the upper extremity. Prereq: HNES 281.
<b>285 Clinical Experience II</b> 1	<b>350 Fitness Education Activities and Materials</b> 3	<b>382 Injury Recognition and Evaluation of the Head, Neck and Spine</b> 3
Clinical proficiencies and clinical experience hours. Prereq: HNES 284.	Topics related to teaching concepts-based fitness in high school physical education. Prereq: HNES 300, 367.	Injury recognition, treatment, management and evaluation of the upper extremity. Prereq: HNES 381.
<b>286 Injury Recognition Laboratory</b> 1	<b>351 Metabolic Basis of Nutrition</b> 4	<b>383 Psychosocial Aspect of the Injured Athlete</b> 3
Introduction to athletic injury assessment. Practical application of topics discussed in HNES 281 lecture. Coreq: HNES 281.	Biochemical and physiological principles of human nutrition. Nutrients in relation to metabolic regulation. Prereq: HNES 250, CHEM 240, BIOC 260 or 460.	Intervention and counseling concepts that prepares the athletic trainer to handle the emotional aspect of the injured athlete. Prereq: HNES 281.
<b>300 Curriculum, Standards, and Assessment in Physical Education</b> 3	<b>352 Physical Education Activities and Materials</b> 3	<b>386 Clinical Experience III</b> 1
This course bridges the gap between theory and practice by providing a practical approach to curriculum writing, standards development and assessment techniques used in K-12 physical education programs. Prereq: HNES 253, 255, 256.	Study of physical education activities and materials that physical education majors and minors will use in EDUC 481. Prereq: HNES 300, 367.	Clinical proficiencies and clinical experience hours. Prereq: HNES 285.
<b>302 Water Safety Instruction</b> 2	<b>354 Introduction to Medical Nutrition Therapy</b> 4	<b>387 Clinical Experience IV</b> 1
Methods of teaching swimming and water safety. Meets American Red Cross standards.	Introduction to the role and skills in nutritional care and application of skills necessary for beginning competency as a clinical dietitian. Prereq: HNES 251, 351.	Clinical proficiencies and clinical experience hours. Prereq: HNES 386.

<b>420 Needs Assessment and Program Planning in Health Education</b> 3	of CSHP. Emphasis on skills required for entry-level health educators. Prereq: HNES 345, Senior standing.	<b>475 Human Performance and Fitness Internship</b> 12	Capstone course for human performance and fitness majors. Supervised field work in a professional setting with emphasis on administration, supervision, and program leadership.
This course provides students with the practical knowledge and skills to assess health resources and needs, and to develop and implement health promotion programs to meet specific needs in particular populations.	<b>452/652 Nutrition, Health, and Aging</b> 3	<b>480 Dietetics Practicum (Capstone Experience)</b> 12	Practical experience with the responsibility equal to that of an entry-level dietitian on the job. 40 hours laboratory per week in clinical facility. Prereq: HNES 458L, 460L.
<b>426 Sport and Recreation Administration</b> 3	Physiological changes with aging and their relationship to food habits and nutritional need. Common nutritional health problems with emphasis on prevention and treatment. Prereq: NUTR 240 or HNES 250.	<b>481 Didactic Capstone Course</b> 2	Capstone for Dietetics majors in the Didactic program in Dietetics.
This course is intended to familiarize sport and recreation studies majors with common administrative practices in sport and recreation. Prereq: Junior standing.	<b>453 Food and Dairy Microbiology</b> 3	<b>482 Community Health Internship</b> 12	Capstone course for Health Education Majors – Community Health Option. Supervised field work in an approved professional setting with an emphasis on administration, supervision and program implementation leadership. Prereq: Senior standing.
<b>427 Leisure and Society</b> 3	See Microbiology for description.	<b>484/684 [384] Therapeutic Exercise</b> 3	Planning and implementing a comprehensive rehabilitation program of athletes with injuries/illnesses. Prereq: HNES 381 or 782.
Survey of leisure problems and opportunities in society. Emphasis on critical analysis of completed writing and research in parks and recreation. Historical foundations and development of a personal philosophy of parks and recreation are stressed. Prereq: HPER 200, Junior standing.	<b>455/655 Sports Nutrition</b> 3	<b>485/685 [385] Therapeutic Modalities</b> 3	Practical use of various therapeutic modalities used in treating athletic injuries. Emphasis on physiological effects, indications, and contraindications of each form of treatment. Prereq: HNES 382 or 782.
<b>428 Sport Management Internship</b> 12	Provides both current research and the translation of research findings into practical advice, offering unique insights on how nutrition can be used to design and effectively implement the optimal diet. Prereq: HNES 240.	<b>486/686 Medical Aspects of Athletic Training</b> 3	Information on a variety of illnesses and conditions that affect the athlete will be discussed. Prereq: HNES 487/687.
Course offers students 520 hours of sport industry work experience.	<b>458/658 Advanced Medical Nutrition Therapy</b> 4	<b>487/687 Administration of Athletic Training Programs</b> 3	Planning, coordinating, and supervising all administrative components of athletic training programs. Prereq: HNES 485/685.
<b>429 Recreation Internship</b> 12	Principles in the nutrition care of patients with conditions requiring nutrition care. Prereq: HNES 354.	<b>488 Clinical Experience V</b> 1	Clinical proficiencies and clinical experience hours. Prereq: HNES 387.
Capstone course for recreation management majors. Supervised professional internship in an approved parks and recreational setting.	<b>458L Advanced Medical Nutrition Therapy Laboratory</b> 3	<b>489 Athletic Training Capstone Experience</b> 1	Capstone experience providing students the opportunity to utilize athletic training skills and knowledge in an off-site setting under the supervision of a clinical instructor. Prereq: HNES 488.
Supervised practice for CP students in nutrition care to accompany HNES 458. Coreq: HNES 458/658.	<b>460 Foodservice Systems</b> 3	<b>701 Administrative Leadership in HNES</b> 3	This course provides an introduction to administrative leadership in health, physical education, recreation and sport. The course is designed to provide students with skills, techniques and practices for successful leadership.
<b>430/630 Socio-Cultural Dimensions in Sport</b> 3	Role of foodservice in today's society. Application of administration concepts in foodservice operation including equipment, layout, marketing, and budget management. Prereq: HNES 361, 361L.	<b>702 Sport Marketing &amp; Public Relations in HNES</b> 3	Understanding the issues and areas involved in sport marketing and public relations in the area of HNES. Discussed are both fund raising strategies and development of communication skills needed for success in this field.
Students will gain a level of understanding of how sport has and does contribute to the notion of nation building in North America and across the world.	<b>460L Foodservice Systems Laboratory</b> 3	<b>703 Scientific Aspects of Sport</b> 3	Essentials of physical training and biomechanical analysis in sport.
<b>431/631 Governance in Sport</b> 3	Supervised practice for CP students in foodservice to accompany HNES 460. Coreq: HNES 460.		
The students will gain a level of understanding of (1) how governance in sport is structured, (2) what governance aims to do, and (3) how and why governance impacts sport.	<b>461 Administrative and Social Aspects of Physical Education and Athletics</b> 3		
<b>435/635 Nutrition, Disease, and Health Professional</b> 2	Study of administrative principles and social aspects that influence the development of physical education and athletic programs. Prereq: HNES 350, 352, Senior standing.		
Principles of client assessment and care that reflect recent advances in nutrition management together with their application to practice. Prereq: HNES 250.	<b>465 Physiology of Exercise</b> 3		
<b>436/636 Issues in Sport Management Economics</b> 3	Effects of exercise on the physiology of the human body. Includes aerobic systems, strength/muscle adaptations, body composition, training programs, and other areas related to training. Prereq: HNES 365.		
Students will gain a level of understanding of issues in sport management economics.	<b>466 Physiology Exercise Laboratory</b> 1		
<b>441 Health and Safety Services</b> 3	Laboratory exercises to test aerobic and anaerobic capacity, strength, body composition, dietary analysis. Coreq: HNES 465.		
American Heart Association and American Red Cross instructor's course in responding to emergencies. Prereq: HPER 210 or HNES 240.	<b>467 EKG Monitoring Physiology</b> 2		
<b>442/642 Community Health and Nutrition Education</b> 3	EKG monitoring and interpretation. Prereq: HNES 466.		
Nutrition education in community settings. Topics include behavior change, education and counseling theory, needs assessment, planning, implementation, and evaluation in a community setting. Prereq: HNES 251.	<b>472 Aerobic Fitness Assessment and Techniques</b> 3		
<b>442L/642L Community Health and Nutrition Education Lab</b> 1	Physiological testing procedures applicable to physical activity and fitness settings, with application to aerobic fitness and body composition assessment. Prereq: HNES 466. Coreq: HNES 467.		
Application of nutrition education and program development in community settings. Coreq: HNES 442/642.	<b>473 Advanced Resistance Training</b> 3		
<b>445 Organization and Administration of Coordinated School Health Programs</b> 3	Designing resistance training programs for various sports and activities, with hands on experience leading people through advanced resistance training exercises. Prereq: HNES 271, 365.		
Capstone course for health educators. Examination of coordinated school health programs (CSHP). Analysis of the components of and approaches to development			

- 704 Psychological Foundation of Sport and Physical Activity** 3  
Comprehensive description of sport psychology, application of concepts to sport performance improvements as well as other areas in physical activity.
- 710 Recent Literature and Research** 3  
Directed readings and class discussions of recent literature, steps involved in problem solving, and critical analysis of research in the field.
- 711 Physical Education Curriculum** 3  
To provide an understanding of the role and importance of physical education in today's society, steps involved in curriculum planning, trends and issues in physical education curriculum and to orient students to various ideas in physical education curriculum design.
- 712 Supervision and Analysis in HNES** 3  
To study the scope of supervision, techniques for improvement of various phases of the learning process of teaching or coaching, and means of evaluating the effectiveness of supervision in the field.
- 713 Graduate Exercise Physiology** 3  
Comprehensive state-of-the-art review of the current knowledge of the physiological responses to exercise.
- 714 Legal Liability in HNES** 3  
Focused on risk management and legal liability in health, physical education, and recreation. Overview of civil and criminal law related to sports and recreation.
- 717 Recreation & Sport Complex Management** 3  
The goal of this class is to explore guidelines and develop a base of information important for the design and management of facilities for physical activity and sport.
- 719 Wellness and Leisure in Adults** 3  
Explores the role of leisure in adult development with specific focus on the aging process, leisure needs, and leisure services. Basic concepts associated with leisure, aging, targeting leisure services, research and public policy are presented.
- 721 Health Promotion Programming** 3  
This course is designed to help students understand and develop skills for health promotion programming, regardless of settings.
- 723 Advanced Techniques in Sports Medicine** 3  
This course will review current research in the latest and most advanced techniques in sports medicine.
- 724 Nutrition Education** 3  
Principles and practices of teaching individuals and groups to translate nutrition knowledge into action. Emphasis on research in evaluation of nutrition education. Prereq: NUTR 240 or HNES 250.
- 726 Nutrition in Wellness** 3  
Course will address wellness promotion through nutrition. Nutritional risk and protective factors will be examined as they relate to public health and individual nutrition.
- 727 Physical Activity in Wellness** 3  
Information and discussion regarding the influence of physical activity on personal wellness. Review of the association between sedentary habits, risk for chronic disease, and the most recent physical activity recommendation to battle disease.
- 750 Human Digestion and Metabolism** 4  
Physiological and biochemical aspects of human digestion and metabolism. Prereq: HNES 351, BIOC 701.
- 754 Assessment in Nutrition and Exercise Science** 3  
Techniques to assess nutritional status, physical fitness status and how to interpret the information received.
- 781 Orthopedic Assessment I** 5  
Practical exposure to evaluation, application, and construction of protective taping devices and techniques. In addition, practice and guidance of injury recognition and evaluation techniques of the lower extremity.
- 782 Orthopedic Assessment II** 5  
Guidance and practice in the evaluation and recognition of athletic injuries to the upper extremity, head, neck, and back, and skin disorders. In addition, environmental conditions will be discussed.
- HISTORY (HIST)**  
Peterson, Chair; Anderson, Danbom, Harvey, Helgeland, Isern, Justitz, Norris
- COURSES**
- 101 Western Civilization I (CCN)** 3  
Introductory survey of Western Civilization from prehistory to 1648, emphasizing major political, social, cultural, and intellectual developments. (ND:HIST)
- 102 Western Civilization II (CCN)** 3  
Introductory survey of Western Civilization from 1648 to the present, emphasizing major political, social, cultural, and intellectual developments. (ND:HIST)
- 103 U.S. to 1877 (CCN)** 3  
Survey of United States history to 1877, emphasizing major political, economic, social, and cultural developments. (ND:HIST)
- 104 U.S. Since 1877 (CCN)** 3  
Survey of United States history since 1877, emphasizing major political, economic, social, and cultural developments. (ND:HIST)
- 135 Race in U.S. History** 3  
The historical development of racism and racial ideas and the interactions among Native Americans, European-Americans, and groups of various races from pre-contact to the present. (ND:HIST)
- 220 North Dakota History (CCN)** 3  
Survey of North Dakota history. Includes social, economic, cultural, and political history of North Dakota from prehistoric times to the present.
- 251 Introduction to Public History (CCN)** 3  
Introduction to history career paths outside of the classroom including museums, historical societies, historic preservation, and historic sites.
- 252 Introduction to Museum Work (CCN)** 3  
Introduction to the variety of careers available and procedures used in museums and historical societies: curatorial, administrative, conservation, research, and educational. Prereq: HIST 251.
- 257 The Cold War (CCN)** 3  
Causes and ideological background of the Cold War. Development of the superpowers. The ideological nature of these opposing societies and how and why the Cold War ended are examined.
- 259 Women in European History 1400-1800 (CCN)** 3  
Exploration of what it meant to be female in early modern Europe: women's options, how women saw themselves, how they were perceived, and origins of these perceptions.
- 260 Women in America (CCN)** 3  
Women in America from pre-colonial times to the present. Focuses on experiences of typical women of the past, including minorities.
- 261 American Indian History (CCN)** 3  
Survey of Native American history, emphasizing diversity of historical experience. Themes include cultural persistence, leadership and activism, and strategies adopted by Indian communities for coping with change. (ND:HIST)
- 265 Families in America (CCN)** 3  
Varieties of family experiences in America from European colonization to the present.
- 268 Rural America (CCN)** 3  
American rural institutions and culture, agricultural practices, economic developments, politics, and public policies from the colonial period to the present.
- 270 American Religious History** 3  
See Religious Studies for description.
- 271 Introduction to Latin American History** 3  
Study of important social, economic, and cultural developments in Latin American history. Emphasizes the socio-economic and cultural topical developments and the political and international factors influencing the region. (ND:HIST)
- 320 History of Christianity** 3  
See Religious Studies for description.
- 333 U.S. Environmental History** 3  
History of the interrelationships of humans and the natural world in America. Emphasis on the emergence of the conservation and environmental movements from 1830's to the present.
- 381 Australia and New Zealand** 3  
Comprehensive, but not exhaustive, historical comparison of Australia and New Zealand with emphasis on formation of national identity(ies). Organized topically to facilitate comparisons.
- 382 Canada** 3  
Topical treatment of the history of Canada, beginning with First Nations and charting the evolution of a bi-cultural, multi-cultural nation-state.
- 390 Historical Research and Writing** 3  
Techniques and skills of historical research and writing. Includes researching in libraries and archives, constructing thesis statements, outlining papers, building logical arguments, writing clear and concise English, using primary sources, footnoting, and copyediting.
- 401/601 Archival Theory and Practice** 3  
Archival theory and its practical application in supervised projects utilizing the resources of the Institute for Regional Studies and University Archives.
- 403/603 Archival Photography** 3  
Application of archival theory and practice to photographs, film, and video. Includes preservation and care methods of curating photographs in museums and libraries. Prereq: HIST 251.

<b>404/604 Historical Editing</b> 3	<b>450/650 Ancient History</b> 3	<b>476/676 Southwestern Borderlands to 1848</b> 3
This course enables students to experience historical editing. They will: research historical topics; edit manuscripts focusing on thesis statements, grammar, and footnoting; and annotate primary sources to make them accessible to the general reader.	Cultural, political, economic, military, and social history of the ancient Near East, Greece, and Rome.	Study of the important social, economic, political, and cultural developments of the American southwest from the pre-Columbian epoch, through Spanish and Mexican ownership, to U.S. acquisition in 1848.
<b>410/610 U.S. Intellectual History I</b> 3	<b>451/651 Medieval History</b> 3	<b>480/680 Recent East Asia I</b> 3
American intellectual trends in areas such as religion, education, racism, science, feminism; social and political thought; 1600-1860. Recommended prereq: HIST 103, 104.	Cultural, political, economic, and social history of the Middle Ages.	Political and diplomatic history of China, Japan, Korea, and Vietnam; interactions between East Asian countries and Western powers, World War I and aftermath in East Asia.
<b>411/611 U.S. Intellectual History II</b> 3	<b>454/654 Renaissance and Reformation</b> 3	<b>481/681 Recent East Asia II</b> 3
American intellectual trends in areas such as religion, education, racism, science, feminism; social and political thought; 1860-present. Recommended prereq: HIST 103, 104.	Political, social, and economic history of continental Europe from 1400 to 1650; with a focus on Renaissance and Reformation.	Political and diplomatic history of China, Japan, Korea, and Vietnam; World War II in the Pacific, communism in China, Korea, and Vietnam, and the industrialization of Japan and Korea.
<b>422/622 U.S. History 1829-1917 I</b> 3	<b>455/655 The Eighteenth Century</b> 3	<b>489 Senior Seminar</b> 3
Political, social, and economic history of the United States 1829-1877; emphasizing socioeconomic change, the Sectional Crisis, the Civil War, and Reconstruction.	Political, social, and economic history of continental Europe from 1650 to 1815; with a focus on Enlightenment and French Revolution.	Capstone experience focused on understanding major concepts and applying knowledge of basic methods and problems. Students evaluate secondary literature, conduct primary research, and master standard forms of historical writing.
<b>423/623 U.S. History 1829-1917 II</b> 3	<b>456/656 Europe 1815-1914</b> 3	<b>701 Methods of Historical Research</b> 3
Political, social, and economic history of the United States 1877-1917; emphasizing industrialization, urbanization, and progressive reform.	Political, social, and economic history of Europe from the defeat of Napoleon to outbreak of World War I.	Techniques and frameworks of historical research, introduction to types of evidence, and evaluation of sources. Taken during the student's first semester in the program.
<b>424/624 U.S. History 1917-Present I</b> 3	<b>457/657 Europe Since 1914</b> 3	<b>702 Historiography</b> 3
Political, social, and economic history of the United States 1917-1960; emphasizing the New Deal, the world wars, and the Cold War era.	Political, social, and economic history of Europe including World War I, the Russian Revolution, Nazism, World War II, and the postwar era.	An introduction to the history of historical thought, from the classical Greeks to the present, with examination of some of the works of important historians writing in the Western tradition.
<b>425/625 U.S. History 1917-Present II</b> 3	<b>460/660 History of England I</b> 3	<b>705 Directed Research</b> 1
Political, social, diplomatic, and economic history of the United States since 1960; emphasizing foreign policy, domestic developments, and socioeconomic change.	England from ancient times to the Hanoverian Succession (1714); emphasis on the Middle Ages and the Tudor-Stuart period.	Directed research on the student's thesis prospectus. Taken close to the end of the student's course work. Prereq: HIST 701.
<b>431/631 The North American Plains</b> 3	<b>461/661 History of England II</b> 3	<b>706 Seminar in the Teaching of History</b> 1-4
Historical treatment of the Great Plains of North America as an international region, comprising the Canadian prairies and the American plains.	England from 1714 to the present; emphasis on the Georgian Era industrialization, liberalism, social reform, and the impact of World War I and World War II.	Includes methods appropriate to college-level teaching. Class consists of discussion, demonstration, and practice. S/U grading only.
<b>434/634 History of Environmental Science</b> 3	<b>466/666 History of Russia I</b> 3	<b>710 Research Seminar in North American History</b> 3
Designed to acquaint students with thinkers and events influencing the history of environmental science, politics, and policy in the United States since the late 19 <sup>th</sup> century.	Cultural, diplomatic, intellectual and political history of Russia; evolution of the Russian state, expansion of Imperial Russia, Great Reforms, populism, and socialism.	This course requires preparation of a research paper. The subject of the research will be within an announced general topic area of North American history. May be repeated.
<b>436/636 American Frontier to 1850</b> 3	<b>467/667 History of Russia II</b> 3	<b>712 Research Seminar in European History</b> 3
Early American frontier from 1500's to mid-1800's, emphasizing Indian-White relations, colonial wars, social life in the backcountry, and exploration and settlement.	Cultural, diplomatic, intellectual, and political history of Russia and the Soviet Union; agriculture, industry, Marxism in Russia, revolution of 1905 and 1917, and the Soviet Union from Lenin to present.	This course requires preparation of a research paper. The subject of the research will be within an announced general topic area of European history. May be repeated.
<b>437/637 American West Since 1850</b> 3	<b>470/670 Modern Latin America I</b> 3	<b>714 Research Seminar in World History</b> 3
Centers on a century of enormous change in the trans-Mississippi west. Major topics include the Plains Indian wars, post-conquest Indian history, mining, cattle, homesteading frontiers, the urban West, and environmental history.	Examines the social, economic, political, and cultural developments in Latin American history. Begins with the wars of independence (circa 1800) and concludes with the emergence of modern states at the close of the 19 <sup>th</sup> century.	This course requires preparation of a research paper. The subject of the research will be within an announced general topic area of World history. May be repeated.
<b>439/639 History of American Agriculture</b> 3	<b>471/671 Modern Latin America II</b> 3	<b>730 Readings in North American History</b> 3
American agriculture from its Native American and European roots to the present.	Study of important social, economic, political, and cultural developments in Latin America from the late 19 <sup>th</sup> century through the modern epoch.	A historiographical survey of a selected topic in North American history. Topics vary by semester. May be repeated. Recommended coreq: HIST 701.
<b>440/640 European Intellectual History I</b> 3	<b>473/673 Mexico I</b> 3	<b>760 Readings in European History</b> 3
Important changes in ideas about science, religion, ethics, political thought, and the arts; Medieval world view, Renaissance, Reformation, Scientific Revolution, the Enlightenment, Romanticism. Prereq: HIST 101, 102.	Study of the important social, economic, political, and cultural developments in Mexican history from the pre-Columbian epoch through the wars for independence, ending in 1821.	Historiographical survey of a selected topic in European history. Topics vary by semester. May be repeated. Recommended coreq: HIST 701.
	<b>474/674 Mexico II</b> 3	
	Study of the important social, economic, political, and cultural developments in Mexican history from independence in 1821 through the contemporary era.	

**780 Readings in World History** 3  
Historiographical survey of a selected topic in World history. Topics vary by semester. May be repeated. Recommended coreq: HIST 701.

## HONORS (HON)

Homan, Coordinator

## COURSES

**386 World Literature: Imaginary Homelands** 3  
Reading and discussion of works from literatures around the world, including philosophical non-fiction, emphasizing the diversity of responses to the human condition. Prereq: Admission to Honors Program.

**489 Senior Thesis** 1-6  
Primary research or creative activity under the guidance of a faculty member.

## HUMAN AND COMMUNITY EDUCATION (H&CE)

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## COURSES

**232 Philosophy and Policy (CCN)** 3  
Principles, philosophies, development, and implementation of agricultural education, family and consumer sciences education, and extension programs. Analysis of evolving concepts with emphasis on history, legislation, and principles underlying organization and practice.

**341 Leadership & Presentation Techniques (CCN)** 3  
Development of youth leadership professionals in educational settings; methods, principles, and practices in organizing, developing, conducting, and evaluating community-based student organizations and student leadership programs.

**345 Extension Education** 2  
Includes purpose, philosophy, and organizational structure of Extension Service nationwide; roles of extension workers and professional ethics; program development, implementation, and evaluation.

**381 Early Experience (CCN)** 1  
See Education for description.

**444 Planning the Community Program in Agricultural Education** 3  
Determining resources and trends of local communities. Emphasis on agricultural education program policies; planning and managing the primary program components; strategies for the management and organization of youth and adult programming in agricultural education. Prereq: Admission to School of Education.

**445 Technology Transfer in Agriculture** 3  
Methods of formal and informal educational programs. Attitudes and values as influences on the introduction and acceptance of new and emerging technologies. Emphasizes global issues. Prereq: H&CE 341.

**468 Family Life and Adult Education Programs** 3  
Philosophy, issues, curricula, and techniques for teaching and evaluating family life and sex education programs K-12 and adult/parenting programs. Includes common program and instructional planning elements. Prereq: EDUC 451.

**469 Housing Education and Issues** 3  
Issues, curricula, and techniques for teaching and evaluating K-12 and adult housing programs.

**474 Extension Internship** 4  
Supervised full-time family and consumer sciences extension internship in an approved location. Prereq: H&CE 345.

**481/681P Methods of Teaching Agriculture** 3  
Methods of planning and teaching agricultural education in secondary and post-secondary settings. Learning theories, innovations and advanced principles in teaching methods and materials, and ethics. Prereq: EDUC 321, 322, admission to School of Education.

**482/682P Methods of Teaching Family and Consumer Sciences** 3  
Methods of planning and teaching consumer/homemaking and occupational family and consumer sciences in middle and secondary schools in diverse cultural settings. Professional ethics will be addressed. Includes advisory committees and vocational student organizations. Prereq: EDUC 321, 322, 381, admission to School of Education.

**483/683P Student Teaching Seminar** 1  
Orientation to student teaching in agricultural education and analysis of professional issues, concerns, and problems associated with AGED, FFA/SAE, and the student teaching experience. Prereq: EDUC 489/689P, 451/651P, 486/686P, H&CE 232, 341. For AGED: H&CE 444, 481/681P. For FACS: H&CE 468, 482/682P. Coreq: H&CE 487/687P.

**487/687P Student Teaching** 9  
See Education for description.

**488/688P Applied Student Teaching** 3  
See Education for description.

**724 Program Development in Vocational Education** 2  
Methods and curricula development in vocational family and consumer sciences education in accordance with state and federal guidelines. Includes long-range and strategic planning competencies.

**740 Vocational Philosophy and Policy** 3  
Philosophy in developing, planning, and conducting vocational education programs at federal, state, and local levels. Importance of legislation on state and local policy-making.

**743 SAE/Adult Programs** 3  
Principles of leadership, design, analysis, record keeping, student organizations, and activities in adult/youth programs. Community-based programs in adult farm business management education. Prereq: Teaching experience.

**746 International Extension** 3  
The ideological and theoretical basis of world agricultural assistance programs and their effects on different sectors and classes. Prereq: H&CE 345.

**751 Rural Survey in Agricultural Education** 3  
Research-type survey of the agricultural education resources unique to the local area/community, research data implications, and current technology implementation. Prereq: Teaching experience, EDUC 702.

**756 Program Development and Evaluation** 3  
Methods and procedures of long-range planning, strategic planning techniques, integrating new/emerging biotechnology, guidance and counseling, and evaluating program effectiveness.

**772 Curriculum Development in Family and Consumer Sciences** 2  
Examination of the major concepts, philosophies, and strategies that influence curriculum decisions in family and consumer sciences programs at all educational levels. Includes assessment of curriculum goals and materials.

**775 Internship** 1-3  
Supervised experience in a formal or informal environment relevant to the application of educational principles. Setting may include middle, secondary, post-secondary, and adult programs.

**777 Evaluation in Family and Consumer Sciences** 2  
Examination of the role of course assessment, teacher effectiveness, facilities, equipment, and staffing patterns in program evaluation. Review of research on evaluation and exploration of alternative evaluation models.

**781 Professional Development in Agricultural Education** 1-3  
Continued professional development in technical and pedagogical subjects of current importance for professionals in agricultural education.

**787 Issues in Education** 1-3  
Exploration and assessment of a current issue associated with middle and secondary applied academic programs. Prereq: Current employment or experience as middle/secondary teacher.

## HUMAN DEVELOPMENT AND EDUCATION (HD&E)

Dean's Office

## COURSES

**189 Skills for Academic Success** 1  
See University Interdisciplinary Studies for description.

**220 Individual and Family Wellness** 2  
Integrative investigation of the wellness of individuals and families in today's complex society. The interdisciplinary nature of human wellness is examined critically and means of optimizing lifelong wellness are addressed. 2 lectures.

**320 Professional Issues** 1  
Analysis and integration of professional perspectives and trends; life career development skills (self-assessment, resume writing, interviewing, and correspondence.) 1 lecture. Prereq: Junior standing.

**777 Advanced Stress Management** 3  
The dynamics of stress, sources and symptoms of stress, and stress management techniques will be presented. Research in stress from the interdisciplinary perspectives of wellness, applied gerontology, and counseling.

## HUMANITIES (HUM)

Cater (Emeritus), Flood, Laliberte

## COURSES

**256 Questions of Philosophy** 3  
Introduction to philosophy, some of its major problems and personalities.

**257 Traditional Logic** 3  
Study of the art and science of critical thinking; scientific method emphasized. Cross-listed with PHIL.



- 304 Humanities Tutorial** R-6  
Development of an individual project based on the theme of the student's program. This project must be submitted and approved during the junior year.
- 356 Ancient Philosophy** 3  
An overview of the main philosophical thinkers and positions in the ancient world. Among the key thinkers addressed are Socrates, Plato, and Aristotle. Cross-listed with PHIL.
- 366 Metaphysics** 3  
Historical and systematic philosophical study of fundamental principles of reality, especially as concerns the human person. Cross-listed with PHIL.
- 367 Ethics: The Acting Person** 3  
Philosophical study of the foundations of human actions, virtue, and vice.
- 371 The Law and the Prophets** 3  
How to interpret the central documents of the faith of Israel for contemporary readers by attending to their distinctive literary structures.
- 372 Wisdom and the New Testament** 3  
Study of special themes in Wisdom and Apocrypha. Introduction to principal New Testament authors.
- 385 Comparative Arts** 3  
Study of Western arts in light of the aesthetic, social, and philosophical ideas that nurtured them.
- 476 History of Philosophy: Modern Period** 3  
An overview of the main philosophical thinkers and positions in the modern period of western civilization. Among the thinkers addressed are Descartes, Leibniz, Locke, Hume, and Kant. Cross-listed with PHIL.
- 477 Contemporary Philosophy** 3  
An overview of the main philosophical thinkers and positions in the contemporary period. Cross-listed with PHIL.
- 486 Philosophy and Literature** 3  
Philosophical elements of selected works from Western literature, such as those of Dante, More, Milton, and Newman. Cross-listed with PHIL.
- 487 Aesthetics** 3  
Principles of aesthetics as revealed by artists, writers, and philosophers. Cross-listed with PHIL.
- 488 Epistemology** 3  
A detailed study of the philosophical analysis of the nature of knowledge and associated concepts. Prereq: HUM 257.
- 702 Introduction to College Teaching in the Humanities and Social Sciences** 3  
Techniques for effective teaching and assessing learning at the college level. Includes special issues and responsibilities related to college-level teaching. Cross-listed with COMM.

## INDUSTRIAL AND MANUFACTURING ENGINEERING (IME)

Isgrig, Chair; Bilen Green, Cook, Ebeling, Maleki, Marinov, Tjokroamidjojo, Wells

### COURSES

- 111 Introduction to Industrial and Manufacturing Engineering** 1  
Introduction to job functions and operating environments for professional careers in industrial engineering and manufacturing engineering. Guest lectures, field trips and student team projects. F
- 112 Computer/Software Applications in Engineering** 2  
Development of skills for using modern computer software to solve engineering problems, prepare reports, plan project schedules and budgets, prepare and deliver professional presentations, and manage data. S
- 310 Survey of Industrial and Systems Engineering Applications** 3  
Overview of industrial and systems engineering careers activities. Development of industrial literacy. Introduction to fundamental industrial and systems engineering in the context of manufacturing, healthcare, transportation and logistics, information and service industries. Systems considerations include products, processes, facilities and equipment, monetary resources and people. F
- 311 Work/Station Design and Measurement** 3  
Analytical methods for measuring human performance in industrial, commercial and manufacturing settings. Development of work procedures and design of workstations. Considerations of ergonomics, safety, performance effectiveness and efficiency, interactions between workstations, information and data requirements, production throughput, training and skill requirements, and resources. Weekly laboratory. S
- 320 Aircraft Corrosion Theory and Control** 2  
Examination of fundamental mechanisms of corrosion; procedures for prevention and control. Emphasis on aircraft structures and their manufacture. Weekly laboratory. Prereq: ME 331. S/2 (odd years)
- 330 Manufacturing Processes I** 2-3  
Traditional manufacturing processing methods as employed in contemporary practice. Includes properties of materials, machining, casting, forming, and fabrication techniques. Several experiments will be conducted on various manufacturing processes in the laboratory. Prereq: ME 212. F, S
- 335 Welding Technology** 2  
Study of arc and gas welding technology together with related metallurgy. Laboratory instruction in welding techniques and skills. 1 recitation, 1 two-hour laboratory. F
- 380 CAD/CAM for Manufacturing** 3  
Coverage of CAD, numerical control, and CAM software. Use of manufacturing standards for geometric dimensioning and tolerancing. Prereq: ME 212. F
- 411/611 Human Factors Engineering** 2  
Study and application of human factors engineering fundamentals. Emphasis on human-system integration and optimization covering both physical and cognitive ergonomics. Human physical and cognitive characteristics, research methods, interface design, task analysis, usability. Prereq: IME 311, 460. F/2 (even years)

- 420/620 Aircraft Design for Manufacturing** 3  
Introduction to aircraft structures and their manufacturing processes through on-line materials. Students will create PowerPoint audio-visual presentations of self-selected in-plant case studies, and connect with Design for Manufacturing (DFM) industry applications through contributing to a journal publication on DFM use in the aircraft industry. Graduate students will propose a state-of-the-art research activity to improve DFM theory and applications. Prereq: IME 330. F/2 (odd years).
- 422 Aircraft Structural Repair and Overhaul** 3  
Applied design and manufacturing engineering methods are used to write Federal Aviation Administration (FAA) approvable airframe/engine repair and overhaul (remanufacturing) procedures. Weekly laboratory. Prereq: IME 330. S/2 (even years)
- 425 Aircraft Component Failure Analysis** 3  
Presentation of metallurgical failure conditions and analysis methods. Study of airframe and engine component failures. Weekly laboratory. Prereq: IME 320. F/2 (even years)
- 427/627 Electronics Manufacturing** 3  
Process and production engineering for manufacturing of electronic components; specialty materials, process parameters, production system design factors, production performance metrics. Introduction to concurrent engineering applied to development of electronic products. Open to all engineering majors. Prereq: Junior standing. F/2 (odd years)
- 430/630 Process Engineering** 3  
Comprehensive analysis of selected manufacturing processes; development of process flow maps, schematic and mathematical modeling of process dynamics, and evaluation of processing alternatives. Design of effective and efficient processes for selected industrial products. Seminar/case study format. Prereq: IME 330. F
- 431/631 Production Engineering** 3  
Design of a production system for selected manufactured products; development of production system flow maps and linked process dynamic models, evaluation of throughput and identification of constraints. Evaluation of alternative solutions for production constraints. Undergraduate: design of fixtures, dies and tooling for economical production; Graduate: in-depth analysis of contemporary production systems issues. Seminar/case study format. Prereq: IME 330. Recommended: IME 430/630. S
- 432 Composite Materials Manufacturing** 3  
Processes for manufacturing products from fiber-reinforced composite materials. Analysis of tooling, process variables and quality management during processing. Design of processes for manufacture of selected composite parts. Weekly laboratory. Prereq: IME 330, ME 331. S
- 435/635 Plastics and Injection Molding Manufacturing** 3  
Product and process engineering for manufacturers of plastic products; material evaluation and selection, mold design, process design, quality evaluation of manufactured plastic parts. Cross-listed with ME.
- 440/640 Engineering Economy** 2-4  
Capital investment decision foundation within the rules of general and project accounting. Analysis of benefits and returns against cost for engineering installation, operation, life cycle, and buy-rent-lease decisions. Prereq: Junior standing or IME major.

<b>450/650 Systems Engineering and Management</b> 3	<b>470/670 Operations Research I</b> 3	<b>765 Data Analysis</b> 3
Integration of technical disciplines through the stages of systems life cycle: needs and requirements determination, operating and support concepts, design and prototyping, test and evaluation, facilitation, manuals, training, and supportability. Prereq: Junior standing. F	Techniques to optimize and analyze industrial operations. Use of linear programming, transportation models, networks, integer programming, goal programming, dynamic programming, and non-linear programming. Prereq: MATH 129, 265. S	Applications oriented. Topics include: statistical estimation, hypothesis testing, non-parametric methods, design of experiments, factorial experiments, response surface methodology, regression analysis, time series analysis and forecasting, multivariate methods, statistical control charts. Prereq: IME 460/660.
<b>451/651 Logistics Engineering and Management</b> 2	<b>472/672 Simulation of Business and Industrial Systems</b> 3	<b>770 Advanced Operations Research Topics</b> 3
Extends systems, methods, production, inventory, and facility topics to integrated logistics support. Emphasis on reliability, maintainability, tools, test equipment, spares, operating and maintenance instructions, and training. Coreq: IME 450. F/2 (odd years)	Development of the fundamentals and techniques of simulating business and industrial systems. Monte-Carlo techniques and computer usage. Prereq: IME 460/660, high-level computer language. S	Study of the theory and applications of linear programming, network flows, and nonlinear programming. Prereq: IME 470/670. F/2 (odd years)
<b>452/652 Integrated Industrial Information Systems</b> 3	<b>480/680 Production and Inventory Control</b> 3	<b>772 Advanced Simulation</b> 3
Integration of technical, business, and operational information for status, progress, and decision making in product development, manufacturing, and logistical support of product and customers. Prereq: IME 450. S	Planning and controlling of industrial production and inventory: demand forecasting, master scheduling, materials requirements planning, job scheduling, assembly line balancing, and just-in-time production. Prereq: IME 460/660. F	In-depth study of special purpose simulation languages to model, analyze, and design industrial and engineering systems. Stochastic and deterministic methods are included. Prereq: IME 472/672. S (even years)
<b>453/653 Hospital Management Engineering</b> 3	<b>482/682 Automated Manufacturing Systems</b> 3	<b>774 Neural Networks</b> 3
Survey of management engineering roles in the delivery of health care. Review of functional relationships present in health care delivery systems. Application of industrial engineering tools to solve health care delivery problems focused on cost reduction, process redesign, facility design, quality improvement, and systems integration. Prereq: Core IME courses. S/2 (even years)	Design of integrated production systems including flexible, programmed automatic control for fabrication, assembly, packaging, movement, and storage. Numerical control, flexible manufacturing systems, and computer integrated manufacturing. 2 recitations, 1 three-hour laboratory. Prereq: IME 311, 330, PHYS 252. F	See CSCI 735 for description.
<b>455/655 Management of People Systems</b> 2	<b>485/685 Industrial and Manufacturing Facility Design</b> 3	<b>780 Advanced Production and Inventory Control</b> 3
Study of traditional management functions (planning, organizing, influencing, and controlling) in the context of engineering and management system interactions. Emphasis on communication skills, teaming, job design, leadership, facilitation, and improving employee productivity. Prereq: Junior standing. F	Capstone integration of analysis and design tools to convert product design into production plans and plants. Prereq: Senior standing. S	Study of the theory and applications of production scheduling, inventory management, production planning, just-in-time production, and materials requirement planning. Prereq: IME 480/680. F (even years)
<b>456/656 Program and Project Management</b> 3	<b>489 Manufacturing Engineering Capstone</b> 3	<b>782 Robotics/CAD/CAM/Control Systems</b> 3
Capstone experience. Integration of technical, business, and operational specialties in a project consulting firm. Work with multidisciplinary teams that design, plan, and present for a variety of industrial clients. Prereq: Senior standing. S	Capstone experience. Student projects in design, analysis, and experimental investigation related to manufacturing. Prereq: Senior standing. S	Study of automation, integration of fabrication, and assembly systems. Includes automated material handling and intelligent control systems. Prereq: IME 482/682. S/2 (odd years)
<b>460/660 Evaluation of Engineering Data</b> 3	<b>711 Advanced Human Factors Engineering</b> 3	<b>784 Computer Integrated Manufacturing</b> 3
Design of engineering experiments and evaluations, curve fitting, regression, hypothesis testing, ANOVA, Taguchi methods in engineering design. Coreq: MATH 166. F, S	Research-based study of current human factors engineering problems. Students will review current human factors topics, design and conduct research studies, and produce technical papers reporting results. Prereq: IME 411/611, 460/660. F/2 (odd years)	Study of the continuum of integrated manufacturing processes where computer technology is incorporated in the conception, design, planning, and fabrication of a good or service. The study of philosophy and methods of systematically building flexible and efficient production systems. Prereq: IME 482/682. S/2 (even years)
<b>461/661 Quality Assurance and Control</b> 3-4	<b>720 Surface Engineering</b> 3	<b>785 Facilities Location</b> 3
Proactive and reactive quality assurance and control techniques; emphasis on quality planning, statistical process control, acceptance sampling, and total quality management. Issues in reliability and maintainability engineering. Prereq: IME 460/660. S	Engineering surfaces: structure and properties. Tribology: surface contacts, friction and wear. Surface heat treatment. Solid, liquid and vapor phase deposition processes for tribological coatings. Emerging processes: nano-engineered and diamond-based coatings. Evaluation and characterization of tribological coatings. Prereq: Graduate standing in engineering or science. F (odd years)	Theory and methods of locating facilities. Domains include plant and warehouse siting, emergency service sites, vehicle and hazardous material routing, distribution systems design. Topics include planar single and multi-facility models, network location problems, cyclical networks. Prereq: IME 470/670 or ENGR 770.
<b>462/662 Total Quality in Industrial Management</b> 3	<b>740 Advanced Engineering Economy</b> 3	<b>786 Manufacturing Systems Analysis</b> 3
The meaning and means for achieving "total quality" in all dimensions of industrial activities and organizations. Topics include continuous improvement, statistical process control, leadership, and training. F/2 (even years)	Advanced topics in engineering economy including replacement analysis, capital budgeting, income tax effects on equipment selection, probabilistic models, and manufacturing costing. Prereq: IME 440/640. F/2 (odd years)	Comprehensive analysis of complex issues in the technology and management of modern manufacturing systems and enterprises. Technological issues will impinge on product realization, production of goods, and manufacturing equipment and facilities; management issues addressed will be those drawn from operation of global production enterprises. Seminar format. Prereq: IME 630 or 631 (both preferred). S
<b>463/663 Reliability Engineering</b> 3	<b>761 Quality Engineering</b> 3	<b>LANDSCAPE ARCHITECTURE (LA)</b>
Study and application of statistical models and methods for defining, measuring and evaluating reliability of products, processes and services: life distributions, reliability functions, reliability configurations, reliability estimation, parametric reliability models, accelerated life testing, reliability improvement. Prereq: IME 460/660. S/2 (odd years)	Study and application of advanced statistical tools and techniques for defining, monitoring and improving quality of products, processes and services: statistical control charts, process capability analysis, acceptance sampling of variables and attributes, application of design-of-experiments for product and process optimization, response surface methodology, Taguchi methods. Prereq: IME 461/661. F/2 (odd years)	Clark, Coordinator; Hansen, Kennedy, Krohn, Wiley
		<b>COURSES</b>
		<b>132 Introduction to Landscape Architecture Studio</b> 2
		Laboratory surveying the profession of landscape architecture and exploring problem solving through the design process. Graphic, oral, and written design presentation skills including the use of computer applications.

<b>231 Landscape Architecture Graphics</b> 1	<b>371 Landscape Architecture III</b> 4
Two- and three-dimensional computer skills using required software applications. Emphasis on traditional, computer graphic, and written design communication techniques used in problem solving. Prereq: LA major, LA 132. Coreq: LA 271.	Visual problem solving and large-scale site planning issues. Two-part focus involving the comprehensive visual inventory and analysis along with the immediate application of site planning and design skills. Studio. Prereq: LA major, LA 272.
<b>232 Design Technology</b> 2	<b>372 Landscape Architecture IV</b> 4
See Architecture for description.	Cultural and environmental design issues as they relate to large-scale land planning and site design involved with residential communities. Emphasis within the studio involves site engineering and design detailing. Prereq: LA major, LA 371.
<b>242 Elements of Surveying</b> 2	<b>441 Site Development and Detailing III</b> 3
Surveying for landscape architecture and other non-engineering students. Importance of measurements and errors and use of surveying instruments for obtaining field data and valid measurements. 1 one-hour lecture, 1 three-hour laboratory. Prereq: MATH 104. Recommended: MATH 105.	Advanced exploration into the use of computers and computer-aided design as part of the landscape architecture construction documentation process. Seminar/laboratory. Prereq: LA 372. Coreq: LA 471.
<b>271 Landscape Architecture I</b> 4	<b>471 Advanced Landscape Architecture I</b> 6
Entry-level design generation methods involving concept formation, site inventory and analysis, programming, and simple site organization and planning. Problem solving through graphic, computer-generated, and model development; oral and written communication skills. Prereq: LA major, LA 131. Coreq: LA 231.	Regional systems inventory, visual survey, analysis techniques, and methodologies for design problem solving through graphic, computer, and modeling development. Focus on urban studies and site planning. Studio. Prereq: LA major, LA 372.
<b>272 Landscape Architecture II</b> 4	<b>472 Advanced Landscape Architecture II</b> 6
Continued design development in site organization and planning. Design issues in natural resources, land reclamation, construction technology, and rural development. Intermediate problem solving through two- and three-dimensional graphic techniques; continued oral and written communication skills. Prereq: LA major, LA 271.	Natural resource and land reclamation management techniques as part of contemporary design in landscape architecture. Emphasis on presentation and communication. Studio. Prereq: LA major, LA 471.
<b>322 History of Landscape Architecture</b> 4	<b>531 Advanced Landscape Architecture Planting Design</b> 4
Global overview of the landscape developments from prehistoric civilizations through the 20 <sup>th</sup> century using styles and trends. Emphasis on analyzing historic places and locations as a problem-solving method.	Exploration into the complexity of planning, design, and management of plant communities with an emphasis on natural systems ecology. Lecture and laboratory. Prereq: LA major, LA 331. F (odd years)
<b>331 Introduction to Planting Design</b> 2-3	<b>552 Advanced Landscape Planning</b> 2
Exploration of principles and design methods involved with a wide-range of planting zones and plant habitats throughout North America. 2 credits: Lecture, open to LA majors. 3 credits: Lecture and laboratory; open to LA majors and minors only.	Theories and practices facing landscape architects and planners in the design of urban, suburban, and rural landscapes. Seminar/field trip. Prereq: Senior standing.
<b>341 Site Development and Detailing I</b> 4	<b>563 [561] Programming and Thesis Preparation</b> 3
Intermediate investigations into site planning and design development with a primary focus on site design integration with the technically-related concepts. Prereq: for LA majors: 2 <sup>nd</sup> year standing. For ARCH majors: ARCH 272.	See ARCH 663 for description. Prereq: LA 472.
<b>342 Site Development and Detailing II</b> 3	<b>571 Advanced Landscape Architecture Design III</b> 6
Intermediate-level focus on fundamental site landscape and engineering issues within the construction process. Emphasis on site grading and storm water management. Lecture. Prereq: Junior standing for non-majors.	Environmental systems development and implementation of a complex design problem. Emphasis on landscape architecture design development through graphic, computer, and modeling techniques. Studio. Prereq: LA major, LA 472. Coreq: LA 563.
<b>344 Site Development and Detailing Laboratory</b> 2	<b>572 Design Thesis</b> 8
Applied practical exercises focusing on site layout, site grading and storm water management, and site materials. Emphasis on construction techniques and the preparation of construction drawings and specifications. Coreq: LA 342.	Capstone opportunity as a culmination of design education. Student generated design topic is fully developed and realized from master planning through design development, detailing, and documentation. Prereq: LA 563, 571.
<b>351 Landscape Design</b> 3	<b>581 Professional Practice</b> 3
Focus on small-scale residential and commercial landscape design with an emphasis on design communication. Instruction in traditional and computer-aided drafting, plant installation, landscape detailing, cost estimation, and landscape specifications. Prereq: LA 132.	See ARCH 681 for description. Prereq: LA 472.

## MANAGEMENT INFORMATION SYSTEMS (MIS)

Altenburg, Latimer, Tangpong, Zhang

### COURSES

<b>277 Introduction to UNIX</b> 3
See Computer Science for description.
<b>370 Management Information Systems</b> 3
Introduction to basic concepts and developments in information technology. Overview of the opportunities and challenges in the development and management of organizational information systems from a socio-technical perspective. Prereq: CSCI 116.
<b>371 Web Scripting Languages</b> 3
See Computer Science for description.
<b>375 Database Design for Business Application</b> 3
Fundamentals of conceptualizing and implementing databases. Emphasis is on using query languages to obtain information for decision-making. Includes managerial topics related to database administration, security, integrity, optimization, and distributed databases. Prereq: MIS 370, CSCI 228.
<b>376 Data and Telecommunications Administration</b> 3
Introduction to a wide variety of topics in the voice and data communications field. Prereq: MIS 370, CSCI 228.
<b>470 Information Systems</b> 3
Exploration of managerial issues pertaining to administration of the information systems function in organizations. Issues include planning, operations, control, electronic commerce, and other current topics. Prereq: MIS 376, CSCI 315. Coreq: MIS 375.
<b>770 Information Resource Management</b> 3
Examination of the role of information resources in supporting a wide range of organizational functions by providing a managerial perspective on the use, design, and evaluation of information systems. Focus is managerial rather than technical.

## MATERIALS AND NANOTECHNOLOGY (MNT)

### COURSES

*All courses require graduate standing in science, engineering, or pharmacy.*

<b>729 Materials Characterization</b> 3
Covers basic techniques and methods for characterization of materials, x-ray diffraction and electron microscopy will be discussed in detail. Also covered will be spectroscopies, NMR, FTIR and RAMAN.
<b>730 Nanotechnology and Nanomaterials</b> 3
Reviews principles of nanotechnology, nanomaterials and develops a framework for their understanding. The basic tools of nanotechnology; nanoscale characterization, physics and materials design will be discussed in the context of current engineering applications.
<b>732 Electronic Properties of Materials</b> 3
Describes the fundamental sciences and engineering concepts involved in the design, fabrication, operation, and application of electronic materials.

## LIBRARY SCIENCE (LIB)

### COURSE

<b>121 Introduction to Library Research</b> 1
Basic information on libraries and their services. Exploration of sources of information in print and computer format; explanation of basic library research strategies.

<b>745 Preparing Future Researchers</b> 1	<b>129 Basic Linear Algebra</b> 2	<b>420/620 Abstract Algebra I</b> 3
Involves presentations given by invited faculty from various academic institutions ranging from research oriented to teaching oriented and also R&D project leaders in companies.	Includes content of MATH 128 with the addition of vectors in $n$ -space, subspaces, homogeneous systems, linear independence, rank, and dimension. Prereq: MATH 105 or 107. Credit awarded only for MATH 128 or 129, not both.	Groups, permutations, quotient groups, homomorphisms, rings, ideals, integers. Prereq: MATH 270.
<b>756 Molecular Modeling of Materials</b> 3	<b>146 Applied Calculus I (CCN)</b> 4	<b>421/621 Abstract Algebra II</b> 3
Covers basic fundamentals of molecular statics, molecular dynamics, Monte Carlo modeling techniques and allows students to be able to model complex lattice structures, structures of lattice defects, crystal surfaces, and interfaces.	Limits, derivatives, integrals, exponential and logarithmic functions and applications. Prereq: MATH 103, 107, or placement test. (ND:MATH)	Division rings, integral domains, fields, field extensions, Galois Theory. Prereq: MATH 420/620.
<b>760 Materials Synthesis Processing</b> 3	<b>147 Applied Calculus II (CCN)</b> 4	<b>429/629 Linear Algebra</b> 3
Deals with synthesis and processing issues in materials design.	Definite integrals, double integrals, trigonometry, introduction to differential equations, infinite sequences and series, probability and applications. Prereq: MATH 146.	Vector spaces, linear transformations, eigenvalues and eigenvectors, canonical forms, inner product spaces, and selected applications. Prereq: MATH 270.
<b>MATHEMATICS (MATH)</b>	<b>165 Calculus I (CCN)</b> 4	<b>430/630 Graph Theory</b> 3
Shreve, Chair; Alfonseca, Barabanov, Bocea, Brennan, Ciuperca, Cómez, Cope, Coykendall, Duncan, Litmann, Martin, Olsen, Popovici, Ungar	Limits, continuity, differentiation, Mean Value Theorem, integration, Fundamental Theorem of Calculus and applications. Prereq: MATH 105, 107, or placement test. (ND:MATH)	Graphs and directed graphs, graph models, subgraphs, isomorphisms, paths, connectivity, trees, networks, cycles, circuits, planarity, Euler's formula, matchings, bipartite graphs, colorings, and selected advanced topics. Prereq: MATH 270.
<b>COURSES</b>	<b>166 Calculus II (CCN)</b> 4	<b>435/635 Mathematical Models of Biological Processes</b> 3
<b>101 [099] Elementary Algebra</b> 3	Applications and techniques of integration; polar equations; parametric equations; sequences and series, power series. Prereq: MATH 165.	This course provides an introduction to mathematical methods in biology. Prereq: MATH 270.
Fundamental operations, factoring, fractions, exponents and radicals, equations. For students with little or no background in algebra. Offered through Continuing Education. Special fee required. Does not satisfy any requirements for graduation.	<b>259 Multivariate Calculus</b> 3	<b>436/636 Combinatorics</b> 3
<b>102 Intermediate Algebra (CCN)</b> 3	Functions of several variables, vectors in two and three variables, partial derivatives, surfaces and gradients, tangent planes, differentials, chain rule, optimization, space curves, and multiple integrals. Prereq: MATH 166. Credit awarded only for MATH 259 or 265, not both.	Recurrence relations, formal power series, generating functions, exponential generating functions, enumeration, binomial coefficients and identities, hypergeometric functions, Ramsey theory, Sterling and Eulerian numbers. Prereq: MATH 270.
Properties of the real number system, factoring, linear and quadratic equations, functions, polynomial and rational expressions, inequalities, systems of equations, exponents, and radicals. Offered through Continuing Education. Special fee required. Does not satisfy any requirements for graduation. Prereq: MATH 101 or placement test.	<b>265 Calculus III (CCN)</b> 4	<b>440/640 Axiomatic Geometry</b> 3
<b>103 College Algebra (CCN)</b> 3	Multivariate and vector calculus including partial derivatives, multiple integration, applications, line and surface integrals, Green's Theorem, Stoke's Theorem, and Divergence Theorem. Prereq: MATH 166. Credit awarded only for MATH 259 or 265, not both.	Hilbert's axioms for Euclidean geometry, projective geometry, history of parallel axiom, hyperbolic geometry, elliptic geometry. Prereq: MATH 270.
Relations and functions, equations and inequalities, complex numbers; polynomial, rational, exponential and logarithmic functions; systems of equations, matrices and determinants, sequences and summation. Prereq: MATH 102 or placement test. (ND:MATH)	<b>266 Introduction to Differential Equations (CCN)</b> 3	<b>445/645 Differential Geometry</b> 3
<b>104 Finite Mathematics (CCN)</b> 3	Solution of elementary differential equations by elementary techniques. Laplace transforms, systems of equations, matrix methods, numerical techniques, and applications. Prereq: MATH 259 or 265. Coreq: MATH 128, 129, or 429.	Basic properties of curves and surfaces, Frenet equations, the Gauss Map, intrinsic geometry of surfaces, geodesics, Gauss-Bonnet Theorem, and applications. Prereq: MATH 270.
Systems of linear equations and inequalities, matrices, linear programming, mathematics of finance, elementary probability and descriptive statistics. Prereq: MATH 102 or placement test. (ND:MATH)	<b>270 Introduction to Abstract Mathematics</b> 3	<b>446/646 Introduction to Topology</b> 3
<b>105 Trigonometry (CCN)</b> 3	Sets, symbolic logic, propositions, quantifiers, methods of proof, relations and functions, equivalence relations, math induction and its equivalents, infinite sets, cardinal numbers, number systems. Prereq: MATH 166.	Topology of Euclidean space, metric spaces, topological spaces, bases and neighborhoods, Hausdorff property, continuity, homeomorphisms and embeddings, connectivity, and compactness. Prereq: MATH 270.
Angle measure, trigonometric and inverse trigonometric functions, trigonometric identities and equations, polar coordinates and applications. Prereq: MATH 103, 107, or placement test.	<b>327 Applied Linear Algebra</b> 3	<b>447/647 Molecular Topology</b> 3
<b>107 Precalculus (CCN)</b> 4	Systems of linear equations, matrices, and linear programming, numerical applications. Prereq: MATH 103 or 107, MATH 146 or 165.	Applications of topological techniques to stereochemistry. Topics include three-dimensional manifolds, knots, embedded graphs, chirality, topological rubber gloves, Möbius ladders, topology of DNA, tangles, and the Ernst-Summers theorem. Prereq: MATH 270.
Equations and inequalities; polynomial, rational, exponential, logarithmic and trigonometric functions; inverse trigonometric functions; algebraic and trigonometric methods commonly needed in calculus. Prereq: Placement test. An expedited, combined offering of MATH 103 and 105.	<b>374 Special Problems in Mathematics</b> 1	<b>450/650 Real Analysis I</b> 3
<b>128 Introduction to Linear Algebra</b> 1	Diverse and challenging mathematical problems are considered with the intent of preparing the student for the Putnam Mathematics competition. May be repeated for credit. Pass/Fail only. Prereq: MATH 270.	Sequences and convergence in $\mathbb{R}$ , continuity, uniform convergence, spaces of continuous functions, compactness, fixed point theorems, differentiability, inverse and implicit function theorems, applications. Prereq: MATH 266, 270.
Systems of linear equations, row operations, echelon form, matrix operations, inverses, and determinants. Prereq: MATH 105 or 107. Credit awarded only for MATH 128 or 129, not both.	<b>376 Actuarial Exam Study</b> 1	<b>451/651 Real Analysis II</b> 3
	Selected material from calculus, linear algebra, numerical analysis, and other areas that appear on national actuarial exams. May be repeated for credit. Pass/Fail only. Prereq: MATH 266, 429.	Riemann and Riemann-Stieltjes integration, convergence theorems, multiple integration and Fubini's Theorem, elements of Fourier analysis, applications. Prereq: MATH 450/650.

- 452/652 Complex Analysis** 3  
Complex number systems, analytic and harmonic functions, elementary conformal mapping, integral theorems, power series, Laurent series, residue theorem, and contour integration. Prereq: MATH 265.
- 460/660 Intensive Mathematica** 1  
Thorough overview of the general purpose mathematical software MATHEMATICA: numerical and symbolic calculations for algebra and linear algebra, single and multivariable calculus, ordinary and partial differential equations, 2D- and 3D-graphics, animation, word processing. Prereq: MATH 259 or 265.
- 472/672 Number Theory** 3  
Properties of integers, number theoretic functions, quadratic residues, continued fractions, prime numbers and their distribution, primitive roots. Prereq: MATH 270.
- 473/673 Cryptology** 3  
This course provides an introduction to the methods of cryptography. Classical and modern ciphers are studied from both a cryptographic and cryptanalytic point of view. Prereq: MATH 270 or graduate standing.
- 478/678 History of Mathematics** 3  
Historical considerations emphasizing the source of mathematical ideas, growth of mathematical knowledge, and contributions of some outstanding mathematicians. Prereq: MATH 270.
- 480/680 Applied Differential Equations** 3  
Power series expansions and the method of Frobenius, special functions and their use (Bessel functions, Legendre polynomials); phase plane analysis. Prereq: MATH 266.
- 481/681 Fourier Analysis** 3  
Discrete and continuous Fourier transforms, Fourier series, convergence and inversion theorems, mean square approximation and completeness, Poisson summation, Fast-Fourier transform. Prereq: MATH 265.
- 482/682 Survey of Mathematical Models** 3  
Lagrangian and Hamiltonian dynamics, potential theory, diffusion, hydrodynamics, elasticity; dimensional analysis, tensors; emphasis on how physical concepts are formulated mathematically rather than solution methods. Prereq: MATH 266.
- 483/683 Partial Differential Equations** 3  
Solution methods for potential, diffusion and wave equations; treatments of homogeneous and nonhomogeneous equations; boundary conditions; separation of variables, Green's functions, transform techniques. Prereq: MATH 480/680.
- 488/688 Numerical Analysis I** 3  
Numerical solution of nonlinear equations, interpolation, numerical integration and differentiation, numerical solution of initial value problems for ordinary differential equations. Prereq: MATH 266.
- 489/689 Numerical Analysis II** 3  
Numerical solutions of linear and nonlinear systems, eigenvalue problems for matrices, boundary value problems for ordinary differential equations, selected topics. Prereq: MATH 429/629, 488/688.
- 720, 721 Algebra I, II** 3 each  
Graduate level survey of algebra: groups, rings, fields, Galois theory, and selected advanced topics. Prereq: MATH 421/621.
- 724, 725 Theory of Rings I, II** 3 each  
The ideal theory of commutative rings, structure of (non-commutative) rings, and selected advanced topics. Prereq: MATH 721.
- 726 Homological Algebra** 3  
An overview of the techniques of homological algebra. Topics covered will include categories and functors, exact sequences, (co)chain complexes, Mayer-Vietoris sequences, TOR and EXT. Applications to other fields will be stressed. Prereq: MATH 421/621.
- 728, 729 Linear Algebra I, II** 3 each  
Theory of linear transformations and matrices, canonical forms, inner product spaces, unitary spaces, symmetric forms, generalized inverses, and selected advanced topics. Prereq: MATH 429/629.
- 730, 731 Graph Theory I, II** 3 each  
Graduate-level survey of graph theory: paths, connectivity, trees, cycles, planarity, genus, Eulerian graphs, Hamiltonian graphs, factorizations, tournaments, embedding, isomorphism, subgraphs, colorings, Ramsey theory, girth. Prereq: MATH 430/630.
- 732 Introduction to Bioinformatics** 3  
An introduction to the principles of bioinformatics including information relating to the determination of DNA sequencing. Prereq: STAT 661. Cross-listed with CSCI and STAT.
- 736, 737 Discrete Mathematics I, II** 3 each  
Combinatorial reasoning, generating functions, inversion formulae. Topics may include design theory, finite geometry, Ramsey theory, and coding theory. Advanced topics may include cryptography, combinatorial group theory, combinatorial number theory, algebraic combinatorics, (0,1)-matrices, and finite geometry. Prereq: MATH 436/636.
- 746, 747 Topology I, II** 3 each  
Topological spaces, convergence and continuity, separation axioms, compactness, connectedness, metrizable, fundamental group and homotopy theory. Advanced topics may include homology theory, differential topology, three-manifold theory and knot theory. Prereq: MATH 446/646.
- 750, 751 Analysis I, II** 3 each  
Lebesgue and general measure and integration theory, differentiation, product spaces, metric spaces, elements of classical Banach spaces, Hilbert spaces, and selected advanced topics. Prereq: MATH 451/651.
- 752, 753 Complex Analysis I, II** 3 each  
Analytic and harmonic functions, power series, conformal mapping, contour integration and the calculus of residues, analytic continuation, meromorphic and entire functions, and selected topics. Prereq: MATH 451/651.
- 754, 755 Functional Analysis I, II** 3 each  
Normed spaces, linear maps, Hahn-Banach Theorem and other fundamental theorems, conjugate spaces and weak topology, adjoint operators, Hilbert spaces, spectral theory, and selected topics. Prereq: MATH 751.
- 756 Dynamic Systems** 3  
A study of basic notions of topological and symbolic dynamics. Introduction to measurable dynamics and ergodic theory. Ergodicity, mixing and entropy of dynamical systems. Prereq: MATH 750.
- 760, 761 Ordinary Differential Equations I, II** 3 each  
Existence, uniqueness, and extendibility of solutions to initial value problems, linear systems, stability, oscillation, boundary value problems, difference equations, and selected advanced topics. Prereq: MATH 751.
- 762, 763 Integral Equations I, II** 3 each  
Existence and uniqueness of solutions of Fredholm and Volterra integral equations, Fredholm Theory, singular integral equations, and selected advanced topics. Prereq: MATH 751.
- 764 Calculus of Variations** 3  
Variational techniques of optimization of functionals, conditions of Euler, Weierstrass, Legendre, Jacobi, Erdmann, Pontryagin Maximal Principle, applications, and selected advanced topics. Prereq: MATH 451/651.
- 772, 773 Number Theory I, II** 3 each  
Number theoretic functions, algebraic number fields, prime numbers and their distribution, the Prime Number Theorem and related results, Fermat's Theorem. Prereq: MATH 472/672.
- 778 Modern Probability Theory** 3  
See Statistics for description.
- 780 Methods of Optimization** 3  
See Computer Science for description.
- 781 Mathematical Control Theory** 3  
Standard optimal control and optimal estimation problems; duality; optimization in Hardy space; robust control design. Prereq: MATH 450/650.
- 782, 783 Mathematical Methods in Physics I, II** 3 each  
Tensor analysis, matrices and group theory, special relativity, integral equations and transforms, and selected advanced topics. Prereq: MATH 429/629, 452/652. Cross-listed with PHYS 752, 753.
- 784, 785 Partial Differential Equations I, II** 3 each  
Classification in elliptic, parabolic, hyperbolic type; existence and uniqueness for second order equations; Green's functions, and integral representations; characteristics, nonlinear phenomena. Prereq: MATH 751.
- 786, 787 Mixed Boundary Value Problems I, II** 3 each  
Methods for transient and steady-state solutions of diffusion problems with mixed boundary conditions; integral transforms; Green's function and integral equations formulations, asymptotics. Prereq: MATH 452/652 or 752.
- 788, 789 Numerical Analysis I, II** 3 each  
Numerical solutions to partial differential and integral equations, error analysis, stability, acceleration of convergence, numerical approximation, and selected advanced topics. Prereq: MATH 489/689.

## MECHANICAL ENGINEERING (ME)

Kallmeyer, Chair; Akhatov, Goplen, N. Jazar, Karami, Mahinfalah, Mehta, Nazari, Pieri, Selekwa, Stewart, Stone, Suzen, Ulven, Zhong, Ziejewski

### COURSES

<b>189 Skills for Academic Success</b>	1		
See University Interdisciplinary Studies for description.			
<b>212 Fundamentals of Visual Communications for Engineers</b>	3		
Visual communications for design and manufacturing, computer-aided drawing and design, three-dimensional modeling and orthographic projections, geometric dimensioning and tolerancing, ASME Y14.5 1994 standard, sketching, parametric modeling, drawings and assemblies.			
<b>213 Modeling of Engineering Systems</b>	3		
Introduction to numerical methods used in the solution of engineering problems; computer methods, programming, and graphics; engineering system modeling and simulation; case studies. Prereq: MATH 129, ME 222.			
<b>221 Engineering Mechanics I</b>	3		
Scalar and vector approaches to trusses, frames and machines, internal forces, friction forces, center of gravity, centroid, and moment inertia. Prereq: MATH 165.			
<b>222 Engineering Mechanics II</b>	3		
Dynamics of particles and rigid bodies, work energy, impulse-momentum, principles of conservation of energy and momentum. Prereq: ME 221, MATH 166.			
<b>223 Mechanics of Materials</b>	3		
Introduction to stress, strain, and their relationships; torsion of circular shafts, bending stresses, deflection of beams, stress transformations, buckling. Prereq: ME 221.			
<b>311 Introduction to Aviation</b>	3		
General introduction to aviation and preparation for FAA examination for Private Pilot License, study of FAA regulations, weather conditions, visual and radio navigation.			
<b>312 Introduction to Flight</b>	2		
Instruction in flight procedures, operation of aircraft, and introduction to solo flight. Completion of 15 hours of dual flight instruction required. Coreq: ME 311.			
<b>313 Commercial Instrument Ground School</b>	3		
Preparation of student for FAA written examination for Commercial Certificate and Instrument Rating License; study of commercial flight maneuvers and instrument flying and procedures. Prereq: ME 311 or holder of private pilot license. On demand.			
<b>331 Engineering Materials I</b>	4		
Characterization of microscopic structures and associated macroscopic properties and performance of mechanical engineering design materials (metals, ceramics, plastics) and processing effects. Includes laboratory. Prereq: CHEM 122, ME 223.			
<b>332 Engineering Materials II</b>	3		
Characterization of properties and processes in metals; diffusion, phase diagrams, phase transformation, creep, wear, corrosion, fracture, and fatigue. Prereq: ME 331.			
<b>341 Mechanics of Machinery</b>	3		
Application of solid mechanics principles and computer methods in designing mechanisms for function and performance. Prereq: ME 213.			
<b>350 Thermodynamics and Heat Transfer</b>	3		
Basic concepts, first and second laws of thermodynamics. Introduction to heat transfer principles. Prereq: ME 222.			
<b>351 Thermodynamics I</b>	3		
Basic concepts, properties of pure substances and ideal gases. First and second law, entropy, and availability. Prereq: ME 222, MATH 259.			
<b>352 Fluid Dynamics</b>	3		
Foundations of the science of fluid dynamics. Basic concepts including thermodynamic principles applied to fluids. Development of conservation principles and applications. Prereq: ME 351.			
<b>353 Thermodynamics II</b>	3		
Continuation of thermodynamics. Cycle analysis, thermodynamic relations, mixtures, chemical reactions, and related topics. Prereq: ME 351.			
<b>412/612 Engineering Measurements*</b>	3		
Principles and characteristics of instruments used for engineering measurements, statistical analysis of data, signal conditioning, data acquisition systems. Includes laboratory. Prereq: ECE 303, ME 223.			
<b>415 Emerging Technologies in Mechanical Engineering</b>	3		
Fundamental principles and applications of emerging technologies, including micro/nanofabrication, energy storage and conversion devices, nanotechnology, sensors, and biomedical engineering. Prereq: CHEM 121, 122, PHYS 120 or 251, MATH 259.			
<b>421/621 Theory of Vibrations*</b>	3		
Fundamentals of vibrations; free, forced, and damped vibration of single and multiple degrees of freedom systems. Prereq: ME 213, MATH 266.			
<b>423 Intermediate Mechanics of Materials</b>	3		
Study of failure theories, energy methods, inelastic bending, and elastic stability. Analysis of axisymmetric members, curved beams, and torsion of noncircular bars. Prereq: ME 223.			
<b>435/635 Plastics and Injection Molding Manufacturing</b>	3		
See Industrial and Manufacturing Engineering for description.			
<b>442/642 Machine Design I*</b>	3		
Application of engineering mechanics, material properties, and failure theories to the design of reliable machine components. Prereq: ME 331, 423.			
<b>454/654 Heat and Mass Transfer*</b>	3		
Principles of heat transfer by conduction, convection, and radiation. Introduction to mass transfer principles. Prereq: ME 213, 352, MATH 266.			
<b>457 Thermal Systems Laboratory</b>	3		
Investigation of thermal, fluid and mechanical systems and instrumentations. Statistical methods are used in data collection and analysis. Prereq: ME 454.			
<b>461, 462 Design Project I, II</b>	3 each		
Capstone student project in design, analysis, and experimental investigation in mechanical engineering. Coreq for 461: ME 442, 454, Senior standing in ME. Prereq for 462: ME 461. Courses must be taken in consecutive semesters. Summer classes are based on minimum enrollment.			
<b>463, 464 Plastics Design Project I, II</b>	3 each		
Capstone student project in analysis, design, and experimental investigation in the Coatings and Polymeric Materials option of ME. Coreq for 463: ME 442, 473, 474, Senior standing in ME. Prereq for 464: ME 463. Courses must be taken in consecutive semesters. 463: F; 464: S.			
<b>471/671 Stress Analysis</b>	3		
Coordination of mathematical and modern experimental analysis as applied to engineering materials. Includes laboratory. Prereq: ME 331.			
<b>472/672 Fatigue and Fracture of Metals</b>	3		
Causes and effects of fatigue failure and fracture of metals, analytical methods for fatigue design and fatigue life prediction, fatigue crack initiation and propagation, fatigue testing and validation. Prereq: ME 442.			
<b>473/673 Engineering Plastics for Design</b>	3		
Mechanical and thermal properties of plastics materials as needed to design and manufacture plastics components to support constant and time varying loads. Prereq: ME 331.			
<b>474/674 Mechanics of Composite Materials</b>	3		
Materials, properties, stress, and strength analyses; engineering design and manufacturing aspects of short and continuous fiber-reinforced materials. Prereq: ME 423.			
<b>475/675 Automatic Controls</b>	3		
Introduction to industrial automatic controls. Theory and applications of pneumatic control, continuous process control, and programmable logic control. Demonstrations and discussion of the current industrial practice. Prereq: MATH 266.			
<b>477/677 ME Finite Element Analysis</b>	3		
Introduction to the finite element method and its application to problems in mechanical engineering, including stress analysis. Prereq: ME 423 and ME 213 or ABEN 255.			
<b>479/679 Fluid Power Systems Design</b>	3		
Fluid dynamics principles and fluid properties are applied to the study of function, performance, and design of system components and system for power transmission and control purposes. Prereq: ME 352. Cross-listed with ABEN.			
<b>480/680 Advanced Fluid Dynamics</b>	3		
To provide students with a firm understanding of the rigorous formulations and solutions of advanced problems of fluid dynamics and its applications to classical engineering problems. Prereq: ME 352.			
<b>481/681 Fundamentals of Energy Conversion</b>	3		
Introduction to electric power generating systems and their major components such as turbines, boilers, condensers, and cooling towers. Prereq: ME 353.			
<b>482/682 Fuel Cell Science and Engineering</b>	3		
Fundamental principles, technologies, and applications of fuel cells, an emerging class of energy storage/conversion devices. Prereq: CHEM 121, ME 350 or 351.			

<b>484/684 Gas Turbines</b> 3	<b>731 Mechanical Behavior of Materials</b> 3	<b>352 General Microbiology II</b> 3
Theory and design of gas turbines and components. Prereq: ME 353, 454/654.	Fundamental concepts of elastic, viscoelastic, and plastic deformation of materials; emphasizing atomic and microstructure-mechanical property relationships. Theory of static and dynamic dislocations; fracture, fatigue, and creep as well as strengthening mechanisms in materials. Prereq: ME 331, basic materials science course.	Further exploration of microbiological concepts introduced in MICR 350. Topics include molecular structure, physiology, metabolism, growth and microbial genetics. Prereq: MICR 350.
<b>485/685 Heating, Ventilation, and Air Conditioning</b> 3	<b>734 Smart Materials and Structures</b> 3	<b>352L General Microbiology Lab II</b> 1
Application of the basic fundamentals of thermodynamics, heat transfer, and fluid flow to heating, ventilating, and air conditioning. Prereq: ME 353. Coreq: ME 454/654.	Physics, chemistry, engineering principles and applications of smart materials and structures. Prereq: Any basic materials science (ME 331), solid state physics class (PHYS 401 or 485), or CPM 472/672, 474/674.	Application of principles of microbiology introduced in General Microbiology II using advanced microbiology techniques and tools. Prereq: MICR 350L. Coreq: MICR 352.
<b>486/686 Nanotechnology and Nanomaterials</b> 3	<b>743 Biomechanics of Impact</b> 3	<b>363 Clinical Parasitology</b> 2
See Civil Engineering for description.	Fundamental sciences of engineering and human anatomy that form the basis of biomechanics of soft tissue and bone under dynamic conditions. Prereq: ME 331.	Protozoan, helminthic, and arthropodal parasites of humans. Emphasis on clinical identification, life histories, and control. Prereq: BIOL 150, 150L.
<b>487/687 Internal Combustion Engines</b> 3	<b>751 Advanced Thermodynamics</b> 3	<b>445/645 Animal Cell Culture Techniques</b> 2
Theory and practice of power and propulsion engines utilizing gas as a working substance. Study of gas turbines, spark, and compression ignition engines. Prereq: ME 351.	Rigorous treatment of thermodynamic principles. Emphasis on the concept of availability methods as applied to various engineering systems. Prereq: ME 353.	Methods of animal cell culture propagation and uses for cell culture systems.
<b>489/689 Vehicle Dynamics</b> 3	<b>752 Gas Dynamics</b> 3	<b>452/652 Microbial Ecology</b> 3
Fundamental science and engineering underlying the design and operation of vehicles. Use of previous knowledge of statics, kinematics, dynamics, and machine design. Prereq: ME 341, 421.	Fundamental concepts of fluid dynamics and thermodynamics used in the treatment of compressible flow, frictional flows, and flows with heat transfer or energy release. Prereq: ME 352.	Influence of natural environments on microbial growth. Environmental selection and microbial succession of different species, population interactions, and environmental modification via microbial metabolism. Prereq: MICR 350, 350L.
<b>711 Advanced Engineering Analysis</b> 3	<b>754 Boundary Layer Theory</b> 3	<b>453/653 Food Microbiology</b> 3
Mathematical analysis and numerical treatment of engineering problems, eigenvalue problems in lumped and distributed parameter systems, advanced mathematics applied to engineering design.	Fundamental laws of motion of a viscous fluid used in the consideration of laminar boundary layers, transition phenomena, and turbulent boundary layer flows. Prereq: ME 352.	Study of the nature, physiology, and interactions of microorganisms in foods. Introduction to foodborne diseases, effects of food processing on the microflora of foods, principles of food preservation, food spoilage, and foods produced by microorganism. Prereq: MICR 202L or 350L. Cross-listed with CFS 453/653 and HNES 453.
<b>712 Advanced Finite Element Analysis</b> 3	<b>755 Multiscale Fluid Dynamics</b> 3	<b>454/654 Bioprocessing</b> 3
Application of finite element methods to problems of plasticity, viscoplasticity, fracture, vibrations, fluids, material and geometric non-linearity, and heat transfer. Prereq: ME 477/677.	Fundamental principles of fluid dynamics in micro and nano scales and their applications to direct write nanofabrication technologies and fuel cells. Prereq: ME 352.	The use of microorganisms and enzymes for processing agricultural materials into industrial products including foods, bio-fuels, and antimicrobials. Prereq: MICR 202L, CHEM 260, or graduate standing. Cross-listed with CFS.
<b>717 PC Based Measurements and Controls</b> 3	<b>761 Heat Transmission I</b> 3	<b>460/660 Pathogenic Microbiology</b> 3
Introduction to digital electronics. Discussion of sensors, personal computers, signal conditioning, analog to digital converters, and digital to analog converters; selection of commercial hardware and software. Prereq: ME 412/612.	Advanced study of heat conduction in solids. Analytical, graphical, and numerical evaluations of the temperature field. Use of advanced mathematical methods in the solution of boundary value problems. Prereq: ME 454/654.	Study of the microorganisms that cause disease and of disease processes. Prereq: MICR 202 or 350.
<b>720 Continuum Mechanics</b> 3		<b>460L/660L Pathogenic Microbiology Laboratory</b> 2
See Civil Engineering for description.		Isolation and identification of pathogenic microorganisms. Prereq: MICR 350L.
<b>721 Advanced Dynamics and Vibrations</b> 3		<b>464/664 Etiology/Foodborne Illness</b> 3
Kinematics and dynamics of a particle, a system of particles and a rigid body, orbital motion. Lagrange's equations, vibration theory. Prereq: ME 421/621.		See Food Safety for description.
<b>722 Mechanics of Deformable Solids</b> 3		<b>465/665 Fundamentals of Animal Disease</b> 3
Special problems in theories of failure, contact stresses, thick-walled cylinders, thin tubes, curved beams, energy methods. Prereq: ME 223.		Basic principles of disease processes and prevention. Comparative review emphasizing infectious and management related diseases in production and companion species. Regulation and oversight of animal health and welfare. Prereq: VETS 135, BIOL 150, MICR 202 or 350.
<b>723 Experimental Stress Analysis</b> 3		<b>470/670 Basic Immunology</b> 3
Measurement of deformations that are of significance in the engineering design of load resisting members. Use of optical, electrical, and mechanical instrumentation; brittle coating and photoelastic techniques. Includes laboratory. Prereq: ME 471/671.		Functions and dysfunctions of the immune system in health and disease. Prereq: MICR 350.
<b>725 Advanced Mechanics and Failure of Composites</b> 3		<b>471/671 Immunology and Serology Laboratory</b> 2
Concepts in static, dynamic, impact, and thermal analysis of anisotropic elastic materials. Failure theories, laminated theories, and micromechanics formulations of composites. Prereq: ME 474, 477.		Basic immunological and serological procedures. Prereq: MICR 350.
	<b>MICROBIOLOGY (MICR)</b>	
	Freeman, Head; Berry, Dyer, Gibbs, Gustad, Haggart, Khaitsa, Logue, McEvoy, Prüß, Richman, Schuh Wolf-Hall	
	<b>COURSES</b>	
	<b>202, 202L Introductory Microbiology, Lab (CCN) 2, 1</b>	
	Study of the characteristics and importance of microorganisms with emphasis on their identification, control, and relationships to health and disease. Not for microbiology majors. (ND:LABSC)	
	<b>350, 350L General Microbiology, Lab 3, 1</b>	
	Principles of microbiology for students requiring a rigorous professionally oriented course. Prereq: BIOL 150, CHEM 121.	

*\*Courses ME 612, 621, 642, and 654 are not acceptable for credit in graduate programs in Mechanical Engineering (M.S. or Ph.D.).*

<b>474/674 Epidemiology</b> 3	<b>782 Molecular Microbiological Techniques</b> 3	<b>213 Basic Camp: Camp Challenge</b> 3
See Food Safety for description.	Familiarize students with current molecular and immunologic strategies and techniques commonly used to study infectious disease processes. Prereq: BIOC 460, 461, 474, MICR 471.	A paid six-week summer camp at an Army post. Travel, lodging, and most meal expenses are defrayed by the Army. Rigorous environment similar to Army basic training. No military obligation incurred. Application required.
<b>475/675 Animal Virology</b> 3	<b>783 Advanced Bacterial Genetics and Phage</b> 3	<b>214 United States Military History</b> 2
The biology of animal viruses with emphasis on virus replication and pathogenesis. Prereq: MICR 350.	Mechanisms of genetic rearrangement and regulation in bacteria and phage. Recombinant DNA. Prereq: MICR 482/682.	Overview of all United States military operations with emphasis on technology, leadership, strategy, tactics, and logistics of several selected campaigns.
<b>480/680 Bacterial Physiology</b> 3	<b>785 Pathobiology</b> 3	<b>301 Leadership and Problem Solving</b> 3
Composition and function of eubacterial and archaeobacterial cell structure. Nutrition and nutrient transport in bacteria. Principles of energy-yielding carbohydrate metabolism, bacterial fermentation, and respiration. Prereq: MICR 350, 350L. Coreq: BIOC 460.	A study of organ systems pathology with attention to pathogenesis of disease and lesion development. Infectious, neoplastic, degenerative and heritable diseases will be discussed. Emphasis is placed on animal disease. Prereq: MICR 460/660.	Continuation of individual and team building concepts for small unit operations; provides a conceptual framework for decision making, planning, and time management; making safety assessments; introduces movement techniques and pre-execution checks. Coreq: MS 310. S
<b>482/682 Bacterial Genetics and Phage</b> 3	<b>MILITARY SCIENCE (MS) (ARMY ROTC)</b>	
Principles of bacterial genetics and phage-host relationships. Prereq: MICR 350. Coreq: BIOC 460.	Cranford, Chair; Joyce	
<b>484/684 Food Safety Practicum</b> 2	<b>COURSES</b>	
See Food Safety for description.	<b>101 Foundations of Officership</b> 1	<b>302 Leadership and Ethics</b> 3
<b>486 Capstone Experience in Microbiology</b> 3	Introduce fundamental concepts consistent with the military culture; includes leadership, ethics, and Army values. Increase self-confidence through team study and activities involving military skills, leadership reaction course, and making presentations. Weekly lab required. Coreq: MS 310. F	Develop skills in planning and leading by conducting training for lower division students. Introduction to operational art and tactics; includes a series of practical opportunities to lead small groups, receive personal assessments and evaluations. Coreq: MS 310. F
Capstone experience to integrate the principles of microbiology with the development of skills in experimental design and scientific discourse. Prereq: Senior standing.	<b>102 Basic Leadership</b> 1	<b>310 Leadership Laboratory</b> 1
<b>561 Microbiology Laboratory for Pharmacy</b> 1	Principles of effective leading; reinforce self-confidence; develop communication skills to improve performance and group interaction; relate organizational ethical values to leadership effectiveness. Weekly lab required. Coreq: MS 320. S	Individual and collective drill, small unit leadership experience, and tactical training to lead small groups, receive personal assessments and encouragement, and defensive tactics. Develop skills in planning and leading by conducting training for lower-division students. Weekly lab, physical fitness program, and field exercises required. May be repeated. F
Students are exposed to laboratory procedures currently used in clinical microbiology laboratories. Prereq: MICR 202, admission to the professional pharmacy program.	<b>110 Army ROTC Physical Fitness</b> 2	<b>313 Advanced Camp</b> 3
<b>572 Clinical Immunology</b> 1	Instruction in planning and leading physical fitness programs. Development of physical fitness required of an Army officer. Emphasis on development of an individual fitness program and the role of exercise and fitness in one's life. F, S	A paid five-week summer camp at an Army post. Highly structured, demanding environment. Emphasis on individual leadership and basic skills performance under challenging conditions. Performance contributes to level of commission upon graduation.
Basic concepts in immunology including special attention to clinical conditions that may appear as a result of immune system activity. Prereq: MICR 202 or 350.	<b>114 Basic Pistol Marksmanship</b> 1	<b>320 Leadership Laboratory</b> 1
<b>750 Advanced Topics in Epidemiology</b> 3	Fundamentals of military pistol marksmanship techniques, firearms safety, range safety, marksmanship programs, and methods of instruction.	Small unit drill, as well as tactical application of leadership fundamentals at the squad/patrol leader level. May be repeated. S
See Food Safety for description.	<b>115 Basic Rifle Marksmanship</b> 1	<b>401 Leadership and Management</b> 3
<b>752 Advanced Food Microbiology</b> 3	Fundamentals of military rifle marksmanship techniques, firearms safety, range safety, marksmanship programs, and methods of instruction.	Plan, conduct, and evaluate activities of the ROTC cadet organization. Articulate goals, put plans into action. Introduce staff organization and processes. Assess organizational cohesion and develop improvement strategies. Apply Army policies. Coreq: MS 410.
See Food Safety for description.	<b>201 Individual Leadership Studies</b> 2	<b>402 Officership</b> 3
<b>762 Advanced Pathogenic Bacteriology</b> 3	Apply ethics-based leadership skills in oral presentations, writing concisely, planning events, coordinating group efforts, first aid skills, land navigation, and basic military tactics. Focuses on personal development and includes ROTC leadership assessment program. Coreq: MS 310. F	Continuation of planning, conducting, and evaluating activities of the ROTC cadet organization. Articulate goals, put plans into action. Introduce staff organization and processes. Assess organizational cohesion and develop improvement strategies. Apply Army policies. Coreq: MS 420.
Biophysical and biochemical mechanisms by which microorganisms cause infectious disease and host reactions to the disease. Prereq: MICR 460. Cross-listed with SAFE.	<b>202 Leadership and Teamwork</b> 2	<b>410 Leadership Laboratory</b> 1
<b>770 Immunology of Chronic Infections</b> 3	Continuation of individual and team building concepts for small unit operations; provides a conceptual framework for decision making, planning, and time management; making safety assessments; introduces movement techniques and pre-execution checks. Coreq: MS 310. S	Assumption of command and staff positions within the cadet battalion. May be repeated. F
A study of chronic infections, including pathogens involved, mechanisms of host immunity, and economic and social importance of these organisms. Prereq: MICR 470/670.	<b>775 Molecular Virology</b> 3	<b>420 Leadership Laboratory</b> 1
An in-depth study of current areas of research on human and animal viruses. The replication, pathogenesis, diagnosis, prevention, and control of viruses using contemporary molecular and cellular biology approaches will be examined. Prereq: MICR 460/660, 470/670, 475/675.	<b>781 Advanced Bacterial Physiology</b> 3	Assumption of command and staff positions within the cadet battalion. May be repeated. S
In-depth consideration of various topics in bacterial physiology such as autotrophy, bacterial growth and growth yields, energy-yielding metabolism, and regulation of catabolic pathways. Prereq: MICR 480/680.		



## MODERN LANGUAGE (LANG)

### COURSES

*Uniform numbered course offerings initiated by the department.*

#### 104 [ENGL] English for Non-Native Speakers: Vocabulary and Reading 1-5

Intensive instruction in vocabulary and reading skills required for successful completion of university work by speakers of English as a second language (ESL). May be repeated. Does not satisfy any requirements for graduation.

#### 103 [ENGL] ESL Intermediate Grammar and Writing I 1-5

Grammar, usage, syntax, and extensive work with sentence and paragraph structure, stressing unity, and coherence. Emphasis on skills required for academic work. Does not satisfy any requirements for graduation.

#### 105 ESL Intermediate Grammar/Writing II 1-5

Extended practice in grammar, usage, syntax, and work with paragraph and essay structure. Emphasis on skills needed for academic work. Does not satisfy any requirements for graduation.

#### 106 [ENGL] English for Non-Native Speakers: Oral Skills 1-5

Intensive instruction in speaking and listening skills required for successful completion of university work by speakers of English as a second language (ESL). May be repeated. Does not satisfy any requirements for graduation.

#### 107 Language Use in Writing for ESL I 1-5

Advanced English grammar forms and essay composition for ESL. Focuses on the production and control of grammatical sentences in written communication, with emphasis on skills needed for academic work. Does not satisfy any requirements for graduation.

#### 109 Language Use in Writing for ESL II 1-5

A continuation of LANG 107. Focuses on production and control of grammatical structures in written communication. Emphasis on skills required for academic work. Does not satisfy any requirements for graduation.

## MUSIC (MUSC)

Froelich, Groves, Jones, Mack, Jo Ann Miller, John Miller, Mueller, Olfert, Patnode, Schneider, Thrasher, Weber

### COURSES

#### 101 Fundamentals of Music (CCN) 3

Introduction to fundamental elements of music through the study of scales, chords, basic harmonic progressions, rhythms, and terminology.

#### 103 Introduction to Music History (CCN) 3

Introduction to the major works of music in the Western tradition which define the stylistic elements of musical periods in history. (ND:HUM)

#### 104 Introduction to Music Literature to 1825 (CCN) 3

Understanding and appreciating musical styles and composers up to circa 1825 with some emphasis on the relationship of music to concurrent social and artistic trends. Designed for non-music majors. (ND:HUM)

#### 105 Introduction to Music Literature: 1825 to the Present (CCN) 3

Understanding and appreciating musical styles and composers from circa 1825 to the present with some emphasis on the relationship of music to concurrent social and artistic trends. Designed for non-music majors. (ND:HUM)

#### 108 Roots of American Popular Music (CCN) 3

Survey of American popular music and musicians from Civil War times through the present with an emphasis on historical and sociological influences. Designed for non-music majors. (ND:HUM)

#### 130, 131 Elementary Harmony I, II 3 each

Introduction to the compositional practices of the 18<sup>th</sup> and 19<sup>th</sup> centuries. Prereq for 131: MUSC 130. Coreq: MUSC 132, 133 respectively.

#### 132, 133 Elementary Ear Training I, II 1 each

Development of sight singing and ear training skills. Laboratory band and chorus required. Coreq: MUSC 130, 131 respectively.

#### 141 Symphonic Literature 2

Survey of the history of symphonic literature with emphasis on selected works. Prereq: Ability to read music.

#### 142 Operatic Literature 2

Survey of the history of opera with emphasis on selected works. Prereq: Ability to read music.

#### 143 Keyboard Literature 2

Survey of keyboard styles, instrumental development, and literature (excluding organ) from the early 14<sup>th</sup> century through the 20<sup>th</sup> century, with special emphasis on works from 1775 to 1925. Prereq: Music major or minor.

#### 150 Vocal Methods and Pedagogy I 2

Basic instruction in vocal pedagogy, methods, and literature for music majors.

#### 160, 161 Piano Class I, II 1 each

Group instruction in the basic fundamentals of playing the piano. Designed primarily to meet the basic piano proficiency requirements for music education majors.

#### 162, 163 Voice Class I, II 1 each

Group instruction in the fundamentals of singing. For music students who do not major in voice. May be repeated.

#### Applied Music

Private lessons. Prereq: Qualifying examination in performance.

#### Applied Piano 1

165, 265, 365, 465. May be repeated.

#### Applied Organ 1

166, 266, 366, 466. May be repeated. Tri-College course.

#### Applied Voice 1

167, 267, 367, 467. May be repeated.

#### Applied Wind Instruments 1

168, 268, 368, 468. May be repeated.

#### Applied Percussion Instruments 1

169, 269, 369, 469. May be repeated

#### Elementary Applied Voice, Wind Instruments, Percussion 1 each

170, 171, 172. May be repeated.

#### 173, 273 Supplementary Applied Study 1-2 each

For music performance majors. 173 and 273 registrations should be for one credit; add one credit for supplementary pedagogy study. May be repeated.

#### 174 Pronunciation for Singers I 1

Instruction in the proper pronunciation of English, Italian, German, Latin, and Spanish for song, oratorio, and opera.

#### 175 Pronunciation for Singers II 1

Instruction in the proper pronunciation of French for song, oratorio, and opera. Prereq: MUSC 174.

#### 180 Performance Attendance 0

Attendance at regional performances, including NDSU events. Minimum of five registrations necessary for graduation for music majors, two registrations for music minors. P/F only.

#### 201 World Music (CCN) 3

Survey of the music cultures of major non-Western and non-Anglo North American ethnic groups of the world. (ND:HUM)

#### 230, 231 Advanced Harmony I, II 3 each

Advanced harmonic materials of the common practice period and analysis of small and large forms. Prereq: MUSC 130, 231 respectively. Coreq: MUSC 232, 233 respectively.

#### 232, 233 Advanced Ear Training I, II 1 each

Advanced work with ear training and sight singing materials. Laboratory band and chorus required. Coreq: MUSC 230, 232 respectively.

#### 250 Basic Conducting 2

Study and development of basic ensemble conducting skills.

#### 260, 261 Piano Class III, IV 1 each

Intermediate instruction in class piano. Prereq: MUSC 161.

#### 331 Instrumental Arranging 2

Arranging materials for bands. Prereq: MUSC 231.

#### 332 Choral Arranging 2

Arranging materials for choral ensembles. Prereq: MUSC 231.

#### 340 Music History I 3

Study of the history of music from the Greek period through the Baroque. Prereq: MUSC 103.

#### 341 Music History II 3

Study of the history of music from the Classical period through the 20<sup>th</sup> century. Prereq: MUSC 340.

#### 344 Wind Band Literature 2

See department for description.

#### 346 Survey of Vocal Literature 2

An overview of local literature from 1600 to present. Representative works will include literature from the Western tradition.

<b>350 Vocal Methods and Pedagogy II</b>	2	<b>473 Supplementary Applied Study</b>	3-4	<b>760 Choral Literature 1450-1700</b>	3
Advanced instruction in vocal pedagogy and methods for music education majors. Prereq: MUSC 150.		For music performance majors. Typical registration should be for three credits; add one credit for supplementary pedagogy study. May be repeated.		A study of the choral literature of the Renaissance and early Baroque periods, including major composers, genres, forms, and compositional styles.	
<b>351 Instrumental Conducting and Literature</b>	2	<b>480 Recital</b>	1	<b>761 Choral Literature 1700-1820</b>	3
Fundamentals and techniques of conducting instrumental ensembles with practical application through the study of instrumental literature.		Capstone for performance majors. May be repeated.		A study of the choral literature of the mid-Baroque through the Classical period including major composers, genres, forms, and compositional styles.	
<b>352 Choral Conducting and Literature</b>	2	<b>701 Psychology of Music</b>	2	<b>762 Choral Literature 1820-Present</b>	3
Fundamentals and techniques of conducting choral ensembles with practical application through the study of choral literature.		Study of acoustics, the anatomy and physiology of hearing, and how music and sound are perceived by the listener.		A study of the choral literature of the Romantic period through the present including major composers, genres, forms, and compositional styles	
<b>353 Woodwind Methods I</b>	2	<b>709 Graduate Ensemble</b>	1	<b>765 Band Literature: History and Development</b>	3
Class instruction in woodwind instruments for vocal and instrumental music education majors. Emphasis on pedagogical principles, applied competency of fundamentals, and literature.		Ensemble registration for graduate students. Study and performance of major works of each ensemble. May be repeated.		Historical survey of instrumental literature for wind band, covering repertoire from the Renaissance to the present.	
<b>354 Woodwind Methods II</b>	2	<b>721 Advanced Vocal Pedagogy and Repertoire</b>	2	<b>766 Band Literature: Chamber Music, Other Genres</b>	3
Class instruction in woodwind instruments for instrumental music education majors. Emphasis on advanced pedagogical principles, applied competency of fundamentals and in-depth coverage of literature.		In-depth study of the physical and physiological considerations of vocal technique with application to specific voices and suitable repertoire. May be repeated.		Survey of instrumental literature for wind band, covering music for young bands, wind band and voice, wind band and solo instruments, chamber music, and other genres.	
<b>355 Brass Methods</b>	2	<b>722 Advanced Instrumental Music Pedagogy and Literature</b>	2	<b>767 Vocal Literature I: Baroque and Classical</b>	3
Class instruction in brass instruments for vocal and instrumental music education majors. Emphasis on pedagogical principles, applied competency of fundamentals, and literature.		Advanced study in the pedagogy and literature of wind instruments. Emphasis on techniques of teaching winds in grades 5 through 12. Section 1: Brass pedagogy. Section 2: Woodwind pedagogy. May be repeated.		Performance and research-based study of the vocal literature of the Baroque and Classical eras, including national trends and performance practice.	
<b>357 Marching Band Methods and Techniques</b>	2	<b>731 Applied Study</b>	1-4	<b>768 Vocal Literature II: Romantic</b>	3
Methods and materials for directing, charting, and fielding a high school marching band.		Private applied music study (instrumental, keyboard, vocal, conducting). Course credit determined by program and recommendation of instructor. May be repeated.		Performance and research-based study of the vocal literature of the Romantic era (1800-1915), including national trends and performance practice.	
<b>358 Jazz Methods</b>	2	<b>734 Analytical Techniques</b>	3	<b>769 Vocal Literature III: 20<sup>th</sup> Century and Contemporary</b>	3
History, methods, and materials for teaching jazz styles and improvisation.		Analysis of music of all periods, using a variety of techniques. Music to be analyzed will vary with each offering; may be repeated with permission of instructor. May be repeated.		Performance and research-based study of the vocal literature from 1915 to present, including national trends and performance practice.	
<b>359 Percussion Methods</b>	2	<b>740 Medieval and Renaissance Music History</b>	3	<b>780 Recital</b>	4
Class instruction in percussion instruments for music education majors. Emphasis on pedagogical principles, applied competency, and literature.		In-depth historical study of Medieval and Renaissance musical styles and genres through critical listening, discussions, and student and instructor presentations.		Preparation and presentation of a professional full-length recital in instrument, keyboard, vocal, or conducting performance, with accompanying document. May be repeated.	
<b>364 Jazz Improvisation</b>	2	<b>741 Baroque Music History</b>	3	<b>789 D.M.A. Thesis</b>	4
Basic concepts necessary to play and teach the fundamentals of jazz improvisation. May be repeated.		In-depth historical study of Baroque musical styles and genres through critical listening, discussions, and student and instructor presentations.		Preparation of a capstone written document for the Doctor of Musical Arts degree. At least one registration required for the Performance and Conducting tracks.	
<b>373 Supplementary Applied Study</b>	2-3	<b>742 Classical Music History</b>	3	<b>Organizations</b>	
For music performance majors. Typical registration should be for two credits; add one credit for supplementary pedagogy study. May be repeated.		In-depth historical study of Classical musical styles and genres through critical listening, discussions, and student and instructor presentations.		Membership in all organizations is subject to approval of the director. May be repeated.	
<b>380 Recital</b>	1	<b>743 Romantic Music History</b>	3	<b>111 Marching Band</b>	1
Preparation and presentation of a half recital in instrumental, keyboard, or vocal performance. May be repeated.		In-depth historical study of Romantic musical styles and genres through critical listening, discussions, and student and instructor presentations.		<b>112 Varsity Band (ND:FA)</b>	1
<b>411/611 Form and Analysis</b>	2	<b>744 20<sup>th</sup> Century Music History</b>	3	<b>114 University Summer Band</b>	1
Study of the types of tonal relationships which create musical works of art. Examination of small forms such as motive and phrase, and progressing to large forms such as fugue, variation, and sonata.		In-depth study of the 20 <sup>th</sup> century musical language and compositional values and goals through critical listening, score analysis, discussions, and student and instructor presentations.		<b>115 University Chorus (ND:FA)</b>	1
<b>430/630 Counterpoint</b>	3	<b>748 Music Bibliography and Research Methods</b>	2	<b>302 Wind Ensemble</b>	1
Study of contrapuntal techniques of the Renaissance and Baroque periods through analysis and composition exercises. Prereq: MUSC 231.		Introduction to music reference works, general music bibliography, and research methods.		<b>303 Concert Band (ND:FA)</b>	1
<b>431/631 Contemporary Harmonic Techniques</b>	3			<b>305 Women's Chorus</b>	1
Study of harmonic and contrapuntal techniques of contemporary composers, with exercises in writing in the various styles. Prereq: MUSC 231.				<b>306 Concert Choir (ND:FA)</b>	1
				<b>310 Brass Ensemble</b>	1
				<b>311 Jazz Ensemble</b>	1
				<b>312 Percussion Ensemble</b>	1
				<b>313 Trombone Ensemble</b>	1

314 Brass Chamber Ensemble	1	program, the nature of the nursing profession and utilization of the scientific process. Prereq: Admission to program.
315 Woodwind Chamber Ensemble	1	
316 String Chamber Ensemble	1	
317 Madrigal Singers	1	
318 Dakota Jazz (Vocal)	1	
319 Opera Workshop	1	
320 Vocal Chamber Ensemble	1	
321 Piano Chamber Music	1	
322 Jazz Combo	1	

## NATURAL RESOURCES MANAGEMENT (NRM)

Grygiel, Chair; Ashworth, Barker, Berryhill, Biondini, Bleier, Clambey, Goreham, Kirby, J. Leitch, Lin, Meister, Nuechterlein, Padmanahban, Steele, Stegman, Walter, Zeleznik

### COURSES

**150 Natural Resources Management Orientation** 1  
Introduction to natural resources management issues, concepts, and careers.

**225 Natural Resource and Agro-ecosystems** 3  
See Animal and Range Sciences for description. (ND: SCI)

**264 Natural Resource Management Systems** 3  
See Agricultural Systems Management for description.

**431/631 [731] NEPA & Environmental Impact Assessment** 2  
The interaction and effects of the National Environmental Policy Act (NEPA) with national environmental policy; implementation of the NEPA; public opinion on the state of the environment.

**432/632 [732] Environmental Impact Statement** 2  
A comprehensive overview of the Environmental Impact Statement (EIS) planning process, document preparation, and project management.

**453/653 Rangeland Resources Watershed Management** 3  
See Animal and Ranges Sciences for description.

**701 Terrestrial Resources Management** 3  
Management and ecology of heterogeneous landscapes where ecosystem processes and human activities interact as dynamic components. Prereq: ARSC/BOT 660.

**702 Natural Resources Management Planning** 3  
Presentation of the principles, practices and key policy issues of natural resources management and planning.

**720 Natural Resources Administration and Policy** 2  
A comprehensive analysis of the theory of externalities and their application to the design of natural resources policy. Prereq: ECON 681, NRM 702.

**730 Environmental Law** 1  
Overview of the subject of environmental law.

## NURSING (NURS)

Mooney, Chair; Albaty, Bartsch, Fisher, Greenwald, C. Gross, D. Gross, Kiser-Larson, Lee, Lundeen, McCullagh, Stenson

### COURSES

**240 Nursing as a Scholarly Profession** 3  
Introduction to the practice of professional nursing. The course focuses on the philosophy of the nursing

program, the nature of the nursing profession and utilization of the scientific process. Prereq: Admission to program.

**250 Health Promotion** 2  
Introduction to community as client and setting for nursing practice. Focus on theory and methods of health promotion and teaching-learning. Introduction to providing culturally-sensitive care. Prereq: Admission to program.

**251 Skills and Concepts for Nursing** 2  
Introduction to the nursing process, basic nursing skills and clinical decision-making. Prereq: NURS 240.

**252 Gerontologic Nursing** 2  
This course focuses on health, the deviations of health, and the nursing care of the geriatric population. Prereq: Admission to program.

**340 Leadership and Ethical Reflection** 2  
This courses presents principles of leadership in the nursing profession and in civic life. The role of ethical reflection as an essential component of professional practice is discussed. Prereq: NURS 240.

**341 Foundations of Clinical Nursing** 3  
This course emphasizes the physiologic, psychologic, and pathophysiologic concepts that provide the foundation for professional nursing care. Prereq: 251.

**342 Adult Health Nursing I** 5  
This course emphasizes the pathophysiology and the nursing care of adult clients experiencing common disorders of body systems. 3 credits didactic, 2 credits clinical. Prereq: NURS 340, 360.

**343 Professional Nursing Theories and Concepts** 2  
In this course the licensed practical nurse begins study of the professional nursing role. The course focuses on the philosophy of the nursing program and the nature of the nursing profession. Prereq: Licensure as a practical nurse.

**352 Family Nursing I** 5  
This course focuses on nursing care and health promotion for the childbearing family. Includes identification and care of high-risk clients. 3 credits didactic, 2 credits clinical. Prereq: NURS 342.

**360 Health Assessment (CCN)** 4  
Focuses on health assessment and health promotion of individual clients through utilization of the nursing process and basic nursing concepts.

**362 Family Nursing II** 4  
Focuses on nursing care of the child and family as client. Includes infancy through adolescence, hospitalized and within the community, acutely ill and chronically ill; common stressors throughout the growing years; strategies for health promotion. 3 credits didactic, 1 credit clinical. Prereq: NURS 342, PHRM 300.

**372 Integrated Family Nursing** 2  
Provides the student opportunity to integrate prior learning about pediatric and obstetrical care with an increased knowledge of family dynamics and cultural influences. Prereq: RN or LPN licensure, admission to program.

**402 Mental Health Nursing** 5  
Synthesis and application of nursing and psychiatric-mental health concepts to promote the wellness of individuals and groups. 3 credits didactic, 2 credits clinical. Prereq: NURS 342.

**403 Adult Health Nursing II** 5  
Focuses on the etiology, pathophysiology, and nursing care of adult clients experiencing selected clinical problems originating from respiratory and cardiovascular systems, neuro trauma, and multisystem problems. Care of families of clients is also emphasized. 3 credits didactic, 2 credits clinical. Prereq: NURS 341, 342, PHRM 300.

**404 Adult Health III** 4  
The pathophysiologic mechanisms and organization of nursing care of adult clients experiencing selected complex stressors. 2 credits didactic, 2 credits clinical.

**405 Psychosocial Nursing** 2  
In this course the student will synthesize prior learning with further exploration of psychosocial nursing. Prereq: RN or LPN licensure, admission to program.

**406 Public Health Nursing** 4  
The focus of this course will include the core functions of public health, partnering with the community, primary prevention, creation of healthy environments, service to those at risk, stewardship of resources, and multidisciplinary collaboration. 3 credits didactic, 1 credit clinical. Prereq: NURS 352, 362.

**407 Adult Health: Complex Problems** 5  
Designed for persons with a nursing license, this course focuses on the etiology, pathophysiologic mechanisms, and organization of nursing care for adult clients experiencing selected complex stressors. Prereq: NURS 240 or 360.

**430 Nursing Management** 2  
Study of concepts and issues related to management and leadership in professional nursing.

**440 Nursing Issues/Career** 2  
This course presents an overview of contemporary nursing issues and a guide for career development. Prereq: NURS 340.

**450 Nursing Synthesis and Practicum** 4  
NURS 450 is the capstone course in the nursing major and provides a framework for the student's transition to the entry-level professional role. 1 credit didactic, 3 credits clinical. Prereq: NURS 404, 406.

**601 Theoretical Perspectives of the Discipline** 2  
The course is designed to help the student analyze, critique and apply a variety of nursing theories, models and conceptual frameworks in advanced nursing practice.

**602 Ethics of Health Care and Nursing** 2  
The course provides the graduate nursing student with opportunities to analyze interactions among common clinical, organizational, societal, and policy decisions from ethical and legal perspectives.

**604 Advanced Nursing Research** 3  
Research in nursing includes an exploration of the research process and the methodologies appropriate to nursing.

**606 Health Care Delivery Systems Policy and Financing** 2  
Focus on health care delivery systems configuration, policy development and how health care systems are financed.

- 608 Transcultural and Social Perspectives** 3  
Develop understanding of diversities in races, cultures, individuals, families, communities, populations, lifestyles, gender, and age groups. Changing demographics will be analyzed, major health needs identified, and health promotion and disease prevention plans formulated.
- 612 Advanced Health Assessment** 3  
Performance of health histories, complete physical/psychosocial assessments, and developmental assessments of clients from across the lifespan. A laboratory component is included.
- 612P Practicum I: Advanced Health Assessment** 3  
Clinical opportunities for application of recently learned skills and extended clinical experiences in advanced health assessment. Clinicals are supervised by a health care provider who has documented expertise in the area of specialization. Prereq: NURS 612
- 614 Advanced Pathophysiology I** 2  
**General pathophysiological responses to selected body** systems to disease processes are presented from both biological and behavioral perspectives. Emphasis on normal cellular function, developmental changes and common physiological symptoms.
- 616 Advanced Pathophysiology II** 2  
Builds on the context from NURS 614 with emphasis on normal cellular function, developmental changes and common physiological symptoms. Synergistic clinical manifestations and total body-mind responses to system alterations. Prereq: NURS 614.
- 618 Family Nursing Theory and Health Promotion** 3  
Theoretical foundations and research based interventions related to psychosocial effects of illness, health behaviors, health promotion and disease prevention. Critically examines patterns of health behaviors, influence of psychosocial issues, risk assessment, lifestyles, and developmental stages.
- 620 Advanced Practice Roles** 2  
Focus on the advanced practice nurse's role expectations. Includes an understanding of the profession, regulations and rules of advanced practice, scope of practice, legal ramifications of scope of practice, interdisciplinary, collaborative practice. Prereq: NURS 634P, 641P.
- 620P Practicum IV: FNP Role Integration** 4  
Clinical focus on the advanced practice nurse's role expectations in the primary care setting. Includes an understanding of the profession, regulations and rules of advanced practice, scope of practice, legal ramifications of scope of practice, and interdisciplinary, collaborative practice. Prereq: NURS 634P, 641P.
- 621 Integrative Health Practices** 3  
Integrative therapies with a focus on selected systems of health and specific modalities widely used by health care consumers. Emphasis on assessing patients for use and developing a list of educational and provider resources.
- 623 The Nurse as Educator** 4  
Major study in selected area with an emphasis in research. Prereq: NURS 632.
- 624 Advanced Transcultural Nursing** 3  
Program planning to promote the health of diverse populations will be based on epidemiological data, theory and research. Students will select a specific age group or health problem within a population/cultural group to study in depth. Prereq: NURS 608.
- 625 Advanced Parish Nursing** 3  
Emphasis is placed on the mind-body-soul connection with health and healing. Strategies for designing, implementing and evaluating a parish nurse program, along with administrative implications are explored. Prereq: NURS 616, 618.
- 626 Ethical Considerations of Parish Nursing** 3  
Ethical and legal considerations unique to an advanced parish nursing practice are evaluated and protocols recommended. Theoretical applications, research findings, and policy and legal principles are utilized. Parameters of advanced nursing practice in parish settings will be delineated. Prereq: NURS 602.
- 630 Advanced Community Assessment** 3  
Epidemiologic techniques, reporting, and research will be presented. Emphasis is placed on disease prevention and control. Health problems of national and international significance will be examined and strategies for solutions and/or management will be proposed. Prereq: STAT 330.
- 631 Advanced Pharmacology I** 2  
Information relative to therapeutic management guidelines for treatment of selected disease processes. Drug information by classification and basic principles of pharmacodynamic and pharmacokinetics, clinical uses, mechanisms of action, contraindications, adverse reactions, and client education implications.
- 632 Advanced Pharmacology II** 2  
Continuation of information relative to therapeutic management guidelines for treatment of selected disease processes. Drug information by classification and basic principles of pharmacodynamic and pharmacokinetics, clinical uses, mechanisms of action, contraindications, adverse reactions, and client education implications. Prereq: NURS 631.
- 633 Family Primary Care I: Assessment and Management** 3  
Clinical decision making skills are fostered in the diagnosis, management, monitoring and evaluation of common acute, emergent, and chronic health conditions. Selected case studies of clients will be examined in relation to problems, diagnoses, plans, and evaluations. Prereq: NURS 612P, 616.
- 633P Practicum II: Family Primary Care I** 4  
Clinical opportunities for application of recently learned skills and extended clinical experiences in advanced health assessment. Theory, research and didactic learning experiences are incorporated and supervised by a health care provider with expertise in the area of specialization. Prereq: NURS 631, 633.
- 634 Family Primary Care II: Assessment and Management** 3  
Clinical decision making skills are fostered in the diagnosis, management, monitoring and evaluation of common acute, emergent, and chronic health conditions. Selected case studies of clients will be examined in relation to problems, diagnoses, plans, and evaluations. Prereq: NURS 633.
- 634P Practicum III: Family Primary Care II** 4  
Clinical opportunities for application of clinical experiences in advanced health assessment. Theory, research and didactic learning experiences are incorporated in the student practice and supervised by a health care provider with expertise in the area of specialization. Prereq: NURS 632, 634.
- 640 Adult Nursing I** 3  
Evaluation and synthesis of advanced pathophysiology concepts applied to nursing and health related theories, and research related to client outcomes. Health and illness phenomena, symptom management, and nursing interventions will be reviewed. Prereq: NURS 612, 616.
- 640P Advanced Nursing Practicum I** 3-6  
Clinical opportunities for application of clinical experiences in a primary care setting. Theory, research and didactic learning experiences are incorporated in the students practice and supervised by a health care provider with expertise in the area of specialization. Prereq: NURS 640.
- 641 Adult Nursing II** 3  
Continuation of Adult Nursing I. Emphasis on clinical decision-making, teaching/learning theory and formulation of researchable questions for advanced nursing practice as an adult CNS. Prereq: NURS 640.
- 641P Advanced Nursing Practicum II** 3-6  
An extended practicum time allowing the student a chance to more fully integrate skills and knowledge learned through the graduate program. Emphasis will continue on consultation, program planning, education, health promotion, and prevention of disease/illness. Prereq: NURS 641.
- 712P Assessment Practicum** 6  
In this course the student integrates health history, physical examination and laboratory evaluations in a plan for management of client needs. Prereq: NURS 612.
- 720 Advanced Practice Roles** 2  
Scope of practice, legal parameters of advanced practice, collaborative and interdisciplinary practice in the advanced nursing role. Prereq: NURS 601, 602, 606.
- 730 Clinical Applications** 3  
Student designs individualized study in an area of focus. Options include extension of a scholarly study, extended clinical practice, intensive study of specialized treatment modality and other appropriate foci. Prereq: NURS 634.
- 733P FPC: Residency I** 8  
Student synthesizes skills acquired in previous didactic and clinical courses to provide diagnosis, treatment, and management of an increasingly varied group of clients. Prereq: NURS 633.
- 734P FPC: Residency II** 8  
Student synthesizes skills acquired in previous didactic and clinical courses, in particular NURS 733P, to provide diagnosis, treatment, and management of an increasingly varied group of clients. Prereq: NURS 634, 733P.
- 735P Role Integration** 8  
Focus is on the role of the advanced practice nurse in the primary care setting. Prereq: NURS 733P.
- NUTRITION (NUTR)**  
(See Health, Nutrition and Exercise Science.)

## PEACE AND CONFLICT STUDIES (PS)

Littlefield, Slobin

### COURSE

**201 Introduction to Peace and Conflict Studies** 3  
Interdisciplinary exploration of the roots of violence and non-violence, making use of socio-political, historical, psychological, biological, and spiritual perspectives.

## PHARMACEUTICAL SCIENCES (PSCI)

Singh, Chair; Balaz, Chatterjee, Guo, Hinderliter, Mallik, O'Rourke, Qian, Schnell, Sheng, Singh

### COURSES

**340 Pathophysiology I** 4  
Comprehensive study of the normal and abnormal physiological processes and the mechanisms important to the understanding of pharmacology and drug therapy. Prereq: BIOL 220, 220L, 221, 221L.

**341 Pathophysiology II** 4  
Normal and abnormal physiological processes and the mechanisms important to the understanding of pharmacology and drug therapy. Prereq: PSCI 340.

**368, 369 Pharmaceutics I, II** 4,3  
Quantitative and theoretical principles of science applied to the design, preparation, evaluation, use, and therapeutic limitations of various pharmaceutical dosage forms. Biological and physiochemical principles that govern the absorption, distribution, metabolism, and excretion of drug dosage forms in humans. Prereq: Admission to professional program.

**409/609 Isotope Tracer Techniques** 3  
Theory and techniques for the use of radioactive and stable isotopes in research.

**411/611 Pharmacodynamics and Applied Therapeutics I** 3  
Basic chemical and pharmacological principles applied to the study of therapeutic agents; pharmacologic and therapeutic properties of drugs that affect the autonomic nervous system. Prereq: BIOC 460, PSCI 340.

**412/612 Pharmacodynamics and Applied Therapeutics II** 3  
Pharmacologic and therapeutic properties of chemotherapeutic agents, anti-infectives, and drugs that affect the endocrine system. Prereq: PSCI 341, 411, BIOC 461.

**413/613 Pharmacodynamics and Applied Therapeutics III** 3  
The pharmacological properties of therapeutic agents used in the treatment of the autonomic nervous system and endocrine system. Prereq: PSCI 341, 411, BIOC 461.

**414/614 Pharmacodynamics and Applied Therapeutics IV** 3  
Pharmacologic and therapeutic properties of drugs that affect the cardiovascular, respiratory, and renal systems. Prereq: PSCI 413.

**415/615 Pharmacodynamics and Applied Therapeutics V** 3  
Pharmacologic and therapeutic properties of drugs that affect the gastrointestinal and genitourinary tracts, integumentary/connective tissues, and the central nervous system. Prereq: PSCI 411.

**416/616 Pharmacodynamics and Applied Therapeutics VI** 3  
The pharmacological properties of therapeutic agents used in the treatment of central nervous system disorders. Prereq: PSCI 341, 411, BIOC 461.

**443/643 Toxicology** 2  
Poisons, their mode of action, detoxification, and treatment. Prereq: PSCI 412.

**470/670 Pharmaceutics III: Pharmacokinetics** 3  
Concepts and mathematical techniques for describing the time course of drugs in biological systems.

**545 Clinical Toxicology** 2  
Toxic potential of various poisonous substances including mechanism of toxicity, toxic doses, clinical presentation, clinical and laboratory monitoring and their specific treatment.

**701 Quantitative Drug Design** 2  
Modeling of drug disposition and receptor binding with focus on rational development of new drugs and elucidation of action mechanisms.

**703 Drug Metabolism** 2  
Drug biotransformations and their effects on drug properties such as duration of action, potency, toxicity, and specificity. Prereq: BIOC 702.

**718 Techniques in Pharmaceutical Research** 3  
Application of modern instrumental techniques in the pharmaceutical sciences; qualitative and quantitative determination of physiologically and pharmacologically important substance.

**746 Neuropharmacology** 3  
Study of action mechanisms of drugs affecting the central and peripheral nervous systems.

**747 Cardiovascular Pharmacology** 3  
Study of action mechanisms of drugs affecting the circulatory systems, including their pathology.

**762 Advanced Biopharmaceutics** 2  
Stability and kinetic factors involved in absorption, distribution, metabolism, and excretion of drug products. Prereq: PSCI 470.

## PHARMACY PRACTICE (PHRM)

Miller, Chair; Biberdorf, Brown, R. Clarens, Dewey, Drummond, Frenzel, Halbur, Kearney, Kelsch, Khan, Naughton, R. Nelson, Omvig, Patnaude, Schmitz, Scott, Strandberg, Sylvester, Welch, Wilhelm

### COURSES

**170 Common Medicines and Diseases** 2  
Consumer-oriented introduction to drugs, common dosage forms, usage of common classes of prescription, and over-the-counter drug products. Does not count toward a pharmacy major.

**300 Principles of Clinical Pharmacology** 3  
Principles of pharmacology and therapeutics for nursing and other non-pharmacy health professions. Does not count toward a pharmacy major.

**351 Pharmaceutical Care I** 2  
The first in a six course series, this course is designed to introduce pharmaceutical care and teach pharmacy students about health care systems, drug literature sources and a medical record. The Concept Pharmacy Lab experience is incorporated in this course.

**352 Pharmaceutical Care II** 2  
Continuation of the pharmaceutical care series, students will learn to develop a pharmaceutical care plan, interpret lab values, and discuss health care systems. Prereq: PHRM 351.

**436 Drugs of Abuse Potential** 2  
Psychosocial, financial, and physical consequences of drug abuse including alcohol, narcotics, psychotropics, stimulants, and depressants. Does not count toward a pharmacy major.

**451 Pharmaceutical Care III** 2  
The third course in a six-semester sequence, this course focuses on prescription dispensing, patient consultation, and toxicology. Sample cases and dispensing activities are incorporated into the Concept Pharmacy Lab. Prereq: PHRM 352.

**452 Pharmaceutical Care IV** 2  
The fourth course in a six-semester sequence, this course focuses on use of alternative medicines, drug utilization review, and pharmacy contract evaluation. Sample cases, dispensing activities, and patient consultation are incorporated into the Concept Pharmacy Lab. Prereq: PHRM 451.

**461 Intro to Pharmaceutical Industry** 2  
Introduction to understanding the working environment of the traditional pharmaceutical industry, concentrating on the major business and research divisions and the role that each division plays in the drug development process. Prereq: P2 student.

**462 Stress Management for Health Professionals** 1  
This course for health care professionals will focus on healthy coping skills and self-care techniques for stress reduction and relaxation, not only in their professional lives, but also in providing patient care. Prereq: Pharmacy or Nursing major.

**463 Current Issues in Hospital Pharmacy** 2  
This course will provide students with a working knowledge of issues and requirements faced by hospital pharmacists and the managerial techniques and practice standards utilized in meeting them. Prereq: P2 student.

**464 Current Concepts in Pharmacy Practice** 2  
An evaluation of current issues in pharmacy practice and an introduction to design of a research proposal and completion of IRB requirements. Prereq: P2 student.

**465 Cultural Competence in Pharmacy Practice** 3  
The purpose of this course is to provide education and skill building that will enable pharmacy students to effectively utilize cultural and linguistic competence as a key tool to improve health outcomes for diverse populations. Prereq: Admission to professional program.

**471 Clinical Pharmacokinetics** 2  
Discussion of multiple dosing, determination of dosage regimens, and factors influencing these; drug monitoring, clinical pharmacokinetics of various drug groups. Prereq: PSCI 470.

**475 Pharmacy Practice Management** 3  
This course introduces students to management techniques applicable to the contemporary practice of pharmacy in community and institutional settings. Prereq: Admission to professional program.

<b>480 Drug Literature Evaluation</b> 3	<b>558 PTDI: Gastroenterology and Nutrition</b> 2	<b>323 Modern Philosophy</b> 4
Survey of clinical drug literature sources and evaluation of the original literature. Prereq: Admission to professional program.	Pharmacotherapy of disorders involving the gastrointestinal track and patients requiring specialized nutritional support. Prereq: BS in Pharmaceutical Sciences.	Western philosophy from Descartes to Kant.
<b>485/685 Economic Outcomes Assessment</b> 2	<b>565 Pharmacy-Based Immunization</b> 1	<b>356 Ancient Philosophy</b> 3
The use of pharmacoeconomic analysis and outcomes assessment as applied to health care. Prereq: PHRM 480 or Doctor of Nursing or MBA standing.	This course will provide knowledge of immunology, vaccine-preventable diseases, indications for vaccination, and implementation and maintenance of a pharmacy-based vaccination program. Prereq: BS in Pharmaceutical Sciences.	See Humanities for description.
<b>520 PTDI: Pediatrics-Geriatrics</b> 2	<b>572 Pharmacy Law</b> 2	<b>357 Augustine</b> 3
Focused on providing pharmaceutical care for patients from prenatal period to geriatric years. Specific therapy common to the very young or very old. Prereq: Bachelor of Science in Pharmaceutical Sciences.	Pharmaceutical jurisprudence, including state and federal laws and regulations concerned with the practice of pharmacy.	Study of Augustine's thought, especially philosophical, in its historical context.
<b>532 PTDI: Infectious Disease</b> 3	<b>575 Pharmacy Management</b> 3	<b>359 Thomas Aquinas</b> 3
Clinical, patient-oriented approach to infectious disease. Review of antimicrobial agents combined with specific infectious disease processes and therapies to help the student make sound judgments on infectious disease problems. Prereq: BS in Pharmaceutical Sciences.	Case studies of retail and hospital pharmacy management concerns, as well as the unique consideration of retail pharmacy and institutional factors of hospital pharmacy management.	The philosophy of Thomas Aquinas as a perennial philosophy. Prereq: Junior standing.
<b>534 PTDI: Rheumatology, Endocrine, and Reproduction</b> 2	<b>578 Non-Prescription Medications</b> 2	<b>366 Metaphysics</b> 3
Pathophysiology, diagnostic evaluation, and therapeutic approach to major rheumatology disorders (bones, joints, and musculoskeletal disorders); endocrine disorders (diabetes, mellitus, thyroid, adrenal, and endocrine-based gynecological disorders) and contraceptive pharmacotherapy. Prereq: BS in Pharmaceutical Sciences.	Introduction to over-the-counter medications including indications, contraindications, dosage forms, interactions, side effects, warnings, and precautions.	See Humanities for description.
<b>535 PTDI: Neoplastic Diseases</b> 2	<b>581, 582, 583 Clinical Clerkship I, II, III</b> 6-18 each	<b>476 History of Philosophy: Modern Period</b> 3
In-depth study of the pathophysiology, pharma cotherapy, diagnostic evaluation, and therapeutic approach to major neoplastic disorders. Prereq: BS in Pharmaceutical Sciences.	Experiential clinical training for pharmacy practice. Prereq: P4 student.	See Humanities for description.
<b>536 PTDI: Neurology and Psychiatry</b> 3	<b>PHILOSOPHY (PHIL)</b>	<b>477 Contemporary Philosophy</b> 3
Pathophysiology and pharmacotherapy of the major neurologic and psychiatric disorders. Prereq: BS Pharmaceutical Sciences.	Cater (Emeritus), Cooley	See Humanities for description.
<b>537 PTDI: Renal Disease/Fluid and Electrolytes</b> 3	<b>COURSES</b>	<b>481/681 Philosophy of Science</b> 3
This course focuses on the pathophysiology and pharmacotherapy of major renal diseases including fluid and electrolyte disorders. Emphasis is placed upon application of knowledge to patient care situations and the mastery of pharmacotherapy. Prereq: BS in Pharmaceutical Sciences.	<b>101 Introduction to Philosophy (CCN)</b> 3	Philosophical aspects of science.
<b>538 PTDI: Cardiovascular and Pulmonary Diseases</b> 4	Basic problems, concepts, and methods of philosophy. (ND:HUM)	<b>486 Philosophy and Literature</b> 3
Pharmacotherapy of cardiovascular and pulmonary diseases. Study of the pathophysiology, clinical presentation, and treatment of various cardiovascular and pulmonary diseases. Prereq: BS in Pharmaceutical Sciences.	<b>210 Ethics (CCN)</b> 3	See Humanities for description.
<b>551 Pharmaceutical Care V</b> 2	Overview of different types of approaches to ethical dilemmas such as theistic ethics, naturalistic ethics, and situational ethics. Covers the ethical issues confronted in personal, public, and professional life. Cross-listed with RELS.	<b>487 Aesthetics</b> 3
The fifth in a six-semester sequence, this course focuses on skills necessary to provide advanced pharmacy services. Sample cases, telepharmacy, and supervision of dispensing functions are incorporated into the Concept Pharmacy. Prereq: BS in Pharmaceutical Sciences.	<b>215 Contemporary Moral Issues (CCN)</b> 3	See Humanities for description.
<b>552 Pharmaceutical Care VI</b> 2	Many contemporary moral issues, such as the developed world's duties to the developing world, war, ethical technology, and gender issues are examined in light of the major ethical theories, such as Utilitarianism, Kantianism, and Relativism. (ND:HUM)	<b>PHYSICS (PHYS)</b>
The sixth in a six-semester sequence, this course focuses on skills necessary to provide advanced pharmacy services. Sample cases, service learning, and use of diagnostic tests will be incorporated into the Concept Pharmacy laboratory. Prereq: PHRM 551.	<b>216 Business Ethics</b> 3	Kroll, Chair; Denton, Ihle, May, Sawicki, Swenson, Wagner
	Many of the central moral issues of business, such as consumer rights, advertising, employee rights, and business competition, are examined in light of the major ethical theories, such as Utilitarianism, Kantianism, and Relativism.	<b>COURSES</b>
	<b>257 Traditional Logic</b> 3	<b>110, 110L Introductory Astronomy, Lab (CCN)</b> 3,1
	See Humanities for description.	Qualitative survey of the current understanding of the universe including planetary explorations, solar phenomena, stars, black holes, nebulae, galaxies. (ND: LABSC)
	<b>321 Greco-Roman Philosophy</b> 3	<b>120, 120L Fundamentals of Physics, Lab (CCN)</b> 3,1
	Greco-Roman philosophy from pre-Socratics to the Stoics and Epicureans.	Application of physics concepts and principles to the real world. Topics selected from mechanics, heat, optics, electricity, and magnetism. (ND:LABSC)
	<b>322 Medieval Philosophy</b> 3	<b>211, 211L College Physics I, Lab (CCN)</b> 3,1
	Western philosophy from St. Augustine to Ockham and Marsilius of Padua.	Beginning course for students without a calculus background. Includes basic principles of bodies at rest and in motion, fluids, vibrations, waves, and sound. Prereq: MATH 105. (ND:LABSC)
		<b>212, 212L College Physics II, Lab (CCN)</b> 3,1
		Second course for students without a calculus background. Includes optics, electricity, magnetism, and thermodynamics. Prereq: PHYS 211, 211L. (ND: LABSC)
		<b>215 Research for Undergraduates</b> 1-3
		Special research studies in physics under the supervision of an instructor.
		<b>251, 251L University Physics I, Lab (CCN)</b> 4,1
		Newtonian mechanics of translational and rotational motion, work, energy, power, momentum, conservation of energy and momentum, periodic motion, waves, sound, heat, and thermodynamics. Prereq: MATH 165.
		<b>251R University Physics I Recitation</b> 1
		A recitation that complements PHYS 251 with theory and applications. Coreq: PHYS 251.

- 252, 252L University Physics II, Lab (CCN)** 4,1  
Electric charge, field, potential, and current; magnetic field; capacitance; resistance; inductance; RC, RL, LC and RLC circuits; EM waves; optics. Prereq: PHYS 251, 251L. Coreq: MATH 166.
- 252R University Physics II Recitation** 1  
A recitation that complements PHYS 252 with emphasis on theory and applications. Prereq: PHYS 251. Coreq: PHYS 252.
- 350 Modern Physics** 3  
Breakdown of classical physics, special relativity, Bohr model, Schrodinger mechanics of simple systems, atomic structure, selected topics from nuclear and solid state physics. Prereq: PHYS 252.
- 351, 352 Mechanics I, II** 3 each  
Rigid bodies and systems of particles analyzed with Lagrangians, Hamiltonians, and methods from vector calculus; gravitation; central field problems; wave motion; fluid dynamics. Prereq for 351: PHYS 252, MATH 266. For 352: PHYS 351.
- 361 Electromagnetic Theory** 3  
Electrostatics, magnetostatics, dielectrics, electric circuits, time varying electric and magnetic fields, electromagnetic induction, physical content, and application of Maxwell's equations. Prereq: PHYS 252, MATH 266.
- 370 Introduction to Computational Physics** 3  
Introduction to computational methods, with applications involving planetary motion, numerical integration, chaotic oscillations, percolation, random walks, diffusion limited aggregation, and Fourier transforms. 2 lectures, 2 one-hour laboratories. Prereq: PHYS 251, MATH 166.
- 401 Introduction to Condensed Matter Physics** 3  
Schrodinger's equation and quantum mechanics of simple systems. Properties of solids including band theory of metals and semiconductors, Fermi-Dirac statistics, properties of p-n junction, light emitting diodes and laser diodes. Prereq: PHYS 252, MATH 265.
- 411/611 Optics for Scientists and Engineers** 3  
Introduction to modern optics. Geometric optics, electromagnetic nature of light, polarization, interference, diffraction, fiber optics. Corequisite laboratory with major related optics project. Prereq: PHYS 252. Coreq: PHYS 411L/611L. Cross-listed with ECE.
- 411L/611L Optics for Scientists and Engineers Laboratory** 1  
Required laboratory for PHYS/ECE 411/611. Ten optics experiments plus a major related optics project. Prereq: PHYS 252. Coreq: PHYS 411/611. Cross-listed with ECE.
- 413/613 Lasers for Scientists and Engineers** 2  
Lecture and laboratory introduction to lasers. Spontaneous and stimulated transitions, line-broadening, gain, gain saturation, optical resonators, Fabry-Perot interferometers, theory of laser oscillation, rate equations, transverse modes, coherence, and Gaussian beams. Prereq: PHYS 252.
- 415/615 Elements of Photonics** 3  
Analysis of optical systems using the matrix formulation, wave propagation in anisotropic media, electro-optic effect and laser modulation, physical origin of optical non-linearities, phase matching, optical second harmonic and parametric generation. Prereq: PHYS 252.
- 462/662 Heat and Thermodynamics** 3  
Classical principles and laws of thermodynamics. Cyclic processes and entropy functions. Legendre differential transformations. Clausius equations, and principles of Maxwell's equations. Prereq: PHYS 252.
- 463/663 Statistical Mechanics** 3  
The Maxwell-Boltzmann distribution function and its application to thermodynamic problems. Introduction to Bose-Einstein and Fermi-Dirac statistics. Prereq: PHYS 462.
- 471 Advanced Laboratory** 2  
Advanced laboratory in modern physics: experiments such as electron diffraction, interferometry, magnetic domains, and bubbles. Data analysis and fitting and solutions of differential equations using Mathcad software package.
- 485/685 Quantum Mechanics I** 3  
Operators, one-dimensional wells and barriers, Schrodinger equation, uncertainty, duality, Born interpretation, unstable states, bosons and fermions, central force problems, angular momentum, spin. Prereq: PHYS 350, MATH 266.
- 486/686 Quantum Mechanics II** 3  
Continuation of PHYS 485/685. Perturbation theory, angular momentum addition, variational schemes, WKB method, scattering theory, time dependent problems. Prereq: PHYS 485/685.
- 489 Physics Projects** 1-4  
Capstone experience in physics.
- 752, 753 Mathematical Methods in Physics I, II** 3 each  
See MATH 782, 783 for description. Prereq for 753: PHYS 752.
- 755 Classical Mechanics** 3  
Variational principles, Lagrange's equations, two body central force problem, rigid body motion, Hamilton's equations, canonical transformation, Hamilton-Jacobi theory. Prereq: PHYS 352.
- 758 Statistical Physics** 3  
Review of thermodynamics and statistical mechanics; Monte Carlo and molecular dynamics simulation; applications to phase transitions. Prereq: PHYS 463.
- 761 Electromagnetism** 3  
Review of Maxwell's equations, radiation, collisions between charged particles, dynamics of relativistic particles and fields. Prereq: PHYS 361.
- 771, 772 Quantum Physics I, II** 3 each  
Schrodinger equation, wave packets, uncertainty, angular momentum, spin, second quantization, harmonic oscillator, resistance mechanisms. 2 lectures, 1 laboratory. Prereq for 771: PHYS 486, PPTH 324. For 772: PHYS 771. S (odd years)
- 781 Solid State Physics** 3  
Crystal structure and binding, reciprocal lattices and x-ray diffraction, lattice vibrations, thermal properties, free electron model, band theory, magnetism, superconductivity. Prereq: PHYS 485/685.
- 782 Condensed Matter Physics** 3  
An introduction to soft condensed matter, focusing on colloids, polymers, liquid crystals, surfactants, and biological systems. Topics will include characterization of soft materials, interparticle interactions, structure, equilibrium phase behavior, non-equilibrium properties, and practical applications. Prereq: PHYS 463/663.
- PLANT PATHOLOGY (PPTH)**  
Rasmussen, Chair; Biller, del Rio, Freeman, Gudmestad, Neate, Nelson, Ransom, Secor, Stack, Statler
- COURSES**
- 324 Introductory Plant Pathology** 3  
Etiology, symptomatology and control of representative plant diseases and demonstrations. 2 lectures, 1 laboratory. F
- 453/653 Microscopy** 3  
Principles, advantages, and limitations of light and electron microscopic techniques, including sample preparation, data acquisition, interpretation, and photographic techniques. 2 lectures, 1 laboratory. S (odd years)
- 454/654 Diseases of Field and Forage Crops** 3  
Etiology, symptomatology, control, and importance of field and forage crop diseases. 2 lectures, 1 laboratory. Prereq: PPTH 324. S (even years)
- 455/655 Plant Disease Management** 3  
Diagnosis and control of horticultural crop diseases. 2 lectures, 1 laboratory. Prereq: PPTH 324. S (odd years)
- 456/656 Forest and Shade Tree Pathology (CCN)** 3  
Biotic and abiotic sources of tree decline are included, as are some pathogens of forest products. Recognition and treatment techniques will be covered. Emphasis of field diagnostic skills. Prereq: PPTH 324. S (odd years)
- 460/660 Fungal Biology** 3  
Fungal ecology, morphology, genetics, physiology, taxonomy, and relevance to humans. 2 lectures, 1 laboratory. Prereq: BIOL 150, PPTH 324. F (even years)
- 750 Plant Virology** 2  
Lecture: structure, function, and control of plant viruses and disease. Laboratory: Morphology, purification, and characterization of viruses. 2 lectures, 1 laboratory. Prereq: PPTH 324. S (even years)
- 751 Physiology of Plant Disease** 3  
Infection, penetration, recognition, nutrient transfer, toxins, photosynthesis, and physiological materials. Use of tools, equipment, and supplies used in the industry and application of basic design styles, holiday designs, and displays. 1 lecture, 1 two-hour laboratory. S (odd years)
- 752 Plant Nematology** 2  
Isolation, identification, biology, and controls of plant parasitic nematodes and techniques used in nematology. 3 lectures, 1 laboratory. Prereq: PPTH 324. F (odd years)
- 753 Bacterial Diseases of Plants** 2  
Identification, epidemiology, symptomatology, control, and techniques for studying plant diseases caused by bacteria. 3 lectures, 1 laboratory. Prereq: PPTH 324. F (odd years)

<b>754 Plant Disease Epidemiology</b>	<b>3</b>	Temporal and spatial dynamics of diseases and causative pathogens in plant populations. 2 lectures, 1 laboratory. Prereq: PPTH 324. F (even years)
<b>756 Techniques in Electron Microscopy</b>	<b>3</b>	Operation of transmission and scanning electron microscopes and ancillary equipment. Techniques include fixation, dehydration, critical point drying, embedding, ultra thin sectioning, and metallic sample coating. 1 lecture, 2 laboratories. F (odd years)
<b>759 Host-Parasite Genetics</b>	<b>3</b>	Host-parasite genetics including genetics of plant and pathogens and gene-for-gene relationships. 3 lectures. S (even years)
<b>760 Advanced Mycology</b>	<b>4</b>	Biology and classification of fungi. Emphasis on identification, growth and development, physiology, and etiology of fungi. 2 lectures, 2 laboratories. Prereq: PPTH 460. F (odd years)
<b>761 Advanced Plant Pathology</b>	<b>2</b>	Analysis of advanced and integrated concepts in host-parasite relationships, disease control, mechanisms of resistance, biotechnology, and professionalism. 3 lectures. Prereq: PPTH 324. F (even years)
<b>PLANT SCIENCES (PLSC)</b>		
Schneiter, Chair; Berglund, Berzonsky, Cai, Carena, Christoffers, Dai, Deckard, Dexter, Elias, Grafton, Hammond, Hatterman-Valenti, Helms, Herman, Horsley, Howatt, Johnson, Kianian, Laschkewitsch, Lee, Li, Lym, Manthey, McClean, McMullen, Mergoum, Messersmith, Meyer, Ransom, Schwarz, Smith, Thompson, Williams, Zeleznik, Zollinger		
<b>COURSES</b>		
<b>110 World Food Crops (CCN)</b>	<b>3</b>	Scientific principles of crop growth, worldwide production, management alternatives, and processing for domestic and international consumption. 2 lectures, 1 discussion, 1 tutorial laboratory. F, S (ND:SCI)
<b>111 Genetics and You (CCN)</b>	<b>2</b>	Basic concepts in genetics with emphasis on current human genetics. 2 lectures. S (ND:SCI)
<b>177 Floral Design (CCN)</b>	<b>2</b>	History of floral design, care, handling, and identification of fresh cut flowers and dried materials. Use of tools, equipment, and supplies used in the industry and application of basic design styles, holiday designs, and displays. 1 lecture, 1 two-hour laboratory. S
<b>210 Horticulture Science (CCN)</b>	<b>3</b>	Principles of plant classification, structure, function, growth, propagation, culture, and use of horticultural crops. Covers vegetable and fruit production in the home garden, growing flowers and planting flower beds, and landscaping principles and materials. 3 lectures. F (ND:LABSC)
<b>211 Horticulture Science Laboratory</b>	<b>1</b>	Exercises in plant identification, propagation, nutrition, gardening, greenhouses, lawn care, landscape design, interior plants, pruning, and culture of horticultural crops. 1 two-hour laboratory. F (ND:LABSC)
<b>215 Weed Identification</b>	<b>1</b>	Identification of weed seeds and plants from seedling to mature stages. Emphasis on life cycles, common distribution, and family groupings. 1 one and one half-hour laboratory plus time by arrangement. F
<b>219 Introduction to Prairie and Community Forestry (CCN)</b>	<b>2</b>	Urban and traditional forestry as applied to the Great Plains region, as well as global forests. History, opportunities, and basic interactions of forestry with wildlife, parks and recreation, horticulture, and the ecology of the planet. 2 lectures. F (odd years)
<b>225 Principles of Crop Production (CCN)</b>	<b>3</b>	Principles of field crop production with emphasis on relationships of crops to their climate and production considerations as a means of managing resources and environmental factors. 2 lectures, 1 two-hour laboratory. Prereq: PLSC 110. S
<b>315, 315L Genetics, Lab</b>	<b>3,1</b>	Study of the basis of heredity with emphasis on structure and function of DNA and Mendelian genetics. 3 lectures. Cross-listed with BIOL, BOT, and ZOO. F, S
<b>320 Principles of Forage Production</b>	<b>3</b>	Introduction to several forage crops and their management, forage quality characteristics, use of legumes in rotations, and preservation of forages. 3 lectures, 1 one-hour recitation. Prereq: PLSC 110. F
<b>323 Principles of Weed Science (CCN)</b>	<b>3</b>	Introduction to biological, chemical, cultural, and mechanical weed control; characteristics of weeds and their identification; pesticides application and dissipation. 2 lectures, 1 discussion, 1 tutorial laboratory. Recommended prereq: Junior standing. S
<b>335 Seed Technology and Production</b>	<b>2</b>	Techniques involved in production, harvest, and processing of seed. Special attention to maintenance of genetic and mechanical quality during growth, harvesting, and processing. 3 lectures, 2 two-hour laboratories. Prereq: PLSC 110. S/2.
<b>340 Grain Grading</b>	<b>2</b>	Description and interpretation of the Grain Standards Act and instruction in grading of grain. 3 lectures, 3 two-hour laboratories. Prereq: PLSC 225. S/2
<b>341 Landscape Bidding and Contracting</b>	<b>1</b>	Introduction to the business structures of landscape contracting. Emphasis on understanding the rationale behind pricing, bidding, and completing landscape projects with a net profit. 1 lecture. F (odd years)
<b>350 Sugarbeet Production</b>	<b>2</b>	History, growth, and development; soil and fertility management; weeds, insect, and disease control; cultivars; harvesting, storage, and processing of sugarbeets. Prereq: PLSC 110 or 210. F/2
<b>355 Woody Landscape Plants</b>	<b>3</b>	Nomenclature, identification, and landscape characteristics of native and introduced deciduous and evergreen woody plants commonly used in the Northern Plains. Field trips. 1 lecture, 2 two-hour laboratories. Coreq: BIOL 150 or 151, PLSC 210. F
<b>360 Horticultural Food Crops</b>	<b>4</b>	History, classification, culture, physiological principles, post harvest handling, and marketing of major fruit and vegetable crops. 4 lectures. Coreq: BIOL 150 or 151, PLSC 210. S (odd years)
<b>362 Potato Science</b>	<b>2</b>	History, botany, cultural practices, harvesting, breeding, physiology, storage, and processing of the potato. 2 lectures. Coreq: BIOL 150 or 151, PLSC 110 or 210. F/2 (odd years)
<b>365 Herbaceous Landscape Plants (CCN)</b>	<b>2</b>	Production, identification, and uses of annual, perennial, and bulbous ornamentals in home and public landscapes with consideration to insect and disease problems. 2 two-hour lecture/laboratories. Coreq: BIOL 150 or 151, PLSC 210. F (odd years)
<b>368 Plant Propagation (CCN)</b>	<b>3</b>	Principles and practices of seed propagation and of asexual propagation: cuttings, layering division, specialized structures, grafting, budding, and micropropagation. 2 lectures, 1 two-hour laboratory. Coreq: BIOL 150 or 151, PLSC 210. S
<b>375 Turfgrass Management</b>	<b>3</b>	Species characteristics of cool- and warm-season turfgrasses, including cultural requirements for home lawns, parks, and sports turf. 2 lectures, 1 two-hour laboratory. Coreq: BIOL 150 or 151, PLSC 110 or 210. F (even years)
<b>381 Sports Turf Operations</b>	<b>3</b>	Strategic management practices in sports turf and golf course operations, including development of cultural practices adhering to environmental regulations, personnel management, and budgeting. 3 lectures. Prereq: PLSC 375. F
<b>411/611 Genomics</b>	<b>3</b>	An integrated presentation of genome organization, genome sequencing and characterization, comparative genomics, transcriptomics, proteomics, and metabolomics. Prereq: BIOL 150, STAT 330. F
<b>412 Nursery Production and Management</b>	<b>3</b>	Industry overview, production-management practices, facilities, equipment, nursery stock standards, storage, and over wintering. Field trips. 3 lectures. Coreq: PLSC 368. S (odd years)
<b>422 Greenhouse Production and Management</b>	<b>3</b>	Greenhouse structure and construction, environmental control, plant nutrition, growth regulation, pest control, and business management in relation to commercial production of greenhouse crops, including pot, cut flower, bedding, foliage, and vegetable crops. Field trips. 2 lectures, 1 two-hour laboratory. Coreq: PLSC 368. S (even years)
<b>431/631 Intermediate Genetics</b>	<b>3</b>	Expansion of classical and molecular concepts of genetics; basic concepts of Mendelian, quantitative, population, molecular, and evolutionary genetics. 2 lectures. Prereq: PLSC 315. Cross-listed with BOT and ZOO. F
<b>433/633 Weed Biology and Ecology</b>	<b>2</b>	Principles of weed biology and ecology including reproduction, dormancy, interference, competition, allelopathy, genetics, seedbanks, and herbicide resistance in crop communities. Prereq: PLSC 323. F (even years)
<b>446/646 Genetics and Plant Improvement</b>	<b>3</b>	Genetic principles and their application to plant improvement. Crop evolution, chromosome structure, and population dynamics related to crop improvement methodology. Genetically modified plants, their impact on breeding technique, and the release of improved varieties. 3 one-hour lectures. Prereq: PLSC 315. F
<b>453/653 Advanced Weed Science</b>	<b>2</b>	Integrated weed control programs for crops, pastures, non-cropland, and aquatic environments. Herbicide



formulation and mixtures. Herbicide absorption, translocation, and action. 2 lectures. Prereq: PLSC 323. F

**455/655 Cropping Systems: An Integrated Approach** 3

Integrative capstone focus on the scientific, professional, and ethical issues associated with crop production and management practices using decision case studies. 3 lectures. Prereq: Junior standing. S

**457 Turfgrass Science, Ecology, and Management** 3

A problem solving approach to turfgrass management using the science and ecology involved in turfgrass growth. Emphasis will be on the problems in golf course, sports fields, and professional lawn care operations. 3 lectures. Prereq: PLSC 381. S

**465/665 Advanced Landscape Plants** 2

Nomenclature, identification, and landscape characteristics of native and introduced deciduous and evergreen woody plants grown in Upper Midwest. Emphasis on cultivar introduction, trademarks/patents, adaptation, and diversity within species. Field trips required. 2 two-hour laboratories. Prereq: PLSC 355. F (even years)

**468 Golf Course Irrigation I** 2

Students will work between the classroom and regional golf courses to learn the basic issues of water management, irrigation system design, and maintenance of golf course and other sports facilities. 1 lecture plus hours arranged. Prereq: Senior standing in program. Cross-listed with ASM. S

**469 Golf Course Irrigation II** 1

Irrigation system installation, winterization, start-up, troubleshooting, renovation, and drainage. 1 lecture. Prereq: PLSC 468. Cross-listed with ASM. F

**484/684 Plant Tissue Culture and Micropropagation** 2

Principles, techniques, and applications of plant tissue, organ, cell, protoplast, and embryo culture. Emphasis on micropropagation. 1 lecture, 1 two-hour laboratory. Prereq: PLSC 315. F

**485/685 Arboriculture Science** 3

Tree, shrub, and vine care based on the physiology of shoot and root growth and limitations of the environment. Includes plant and site selection, transplanting, staking, fertilizing, pruning, mulching, and related subjects. 3 lectures. Prereq: PLSC 355. S (even years)

**486/686 Eco-Physiology of Horticultural Crops** 2

Influence of environmental factors, stress and hardiness on plant growth and development, and their relationship to production practices. 2 lectures. Prereq: PLSC 210 or 225. S (odd years)

**710 Professional Development I** 1

(Non-didactic) Introduce students to professional society structure and function, manuscript review, resume preparation, lecture organization, grant writing, and research proposal preparation. F

**711 Professional Development II** 1

(Non-didactic) Manuscript preparation, manuscript review, and grantsmanship. Prereq: PLSC 724 or 710. S

**721 Genomics Techniques** 2

Principles, techniques, and applications of the large-scale analysis of DNA organization and sequence, RNA

expression, protein sequence, and structure. Prereq: PLSC 411/611. Cross-listed with BIOC. S

**724 Field Design I** 3

Application of various field designs, factorial and split-plot arrangements, orthogonal and non-orthogonal comparisons, models, components of variance, correlation, and regression to biological problems. 3 lectures. Prereq: STAT 330 or 725. F

**727 Crop Breeding Techniques** 1

Hybridization of North Dakota crops. Laboratory by arrangement. Prereq: PLSC 446/646, 724. SS (odd years)

**731 Plant Molecular Genetics** 3

Molecular aspects of plant genome organization and expression; basic and applied usages of molecular markers and gene transfer techniques. 3 lectures. Prereq: PLSC 431/631. S (even years)

**734 Field Design II** 2

Application of incomplete block designs, confounding, and covariance analyses to biological problems. 2 lectures. Prereq: PLSC 724. S (odd years)

**741 Cytogenetics** 4

Chromosome behavior during mitosis and meiosis; chromosome structure, function, and recombination; inheritance in aneuploids and polyploids; haploid formation and utilization. 3 lectures, 1 three-hour laboratory. Prereq: PLSC 315. F (even years)

**751 Advanced Genetics** 3

Classical and modern genetic concepts, nature and induction of mutations linkage, and application of chi-square. 3 lectures. Prereq: PLSC 431/631. S (odd years)

**753 Action and Fate of Herbicides** 2

Herbicide mode of action and fate of herbicides in plants and soil, physiology of herbicide resistance, and herbicide antidotes. 2 lectures. Prereq: PLSC 453/653, BIOC 460. S (even years)

**755 Advanced Crop Management Decision Making** 3

Problem-based learning approach focusing on the scientific, professional, personal, and ethical issues associated with advanced crop management decision-making. Prereq: PLSC 455/655. F (even years)

**763 Laboratory Methods — Weed Science** 2

Chemical, analytical, and physiological methods for determining pesticide residues in soil and ground water; and herbicide absorption, translocation, and metabolism in plants. 2 two-hour laboratories. Prereq: PLSC 453/653, BIOC 460. S (odd years)

**776 Advanced Plant Breeding** 4

Application of genetic principles to improvement of self- and cross-pollinated crops. 4 lectures. Prereq: PLSC 446/646, 724. S (odd years)

**780 Population Genetics** 2

Concepts and principles related to genetic properties governing random and non-random mating populations. 2 lectures. Prereq: PLSC 315, STAT 330. F (odd years)

**781 Quantitative Genetics** 2

Applied quantitative genetics and implications on plant breeding. 2 lectures. Prereq: PLSC 724, 780 Recommended: 446/646. S (even years)

**785 Crop Breeding Programs Management** 2

Development of student ability to understand, examine, and evaluate crop breeding and improvement programs. Prereq: PLSC 446/646, 724. F (even years)

**POLITICAL SCIENCE (POLS)**

Thompson, Chair; Ambrosio, Baurth, Gupte, Wood

**COURSES**

**110 Introduction to Political Science (CCN)** 3

Problems of political science as a discipline, political systems, and political behavior. Includes causes and consequences of individual and group political behavior. (ND:SS)

**115 American Government (CCN)** 3

Principles of American government, political behavior, and institutions. (ND:SS)

**120 Terrorism (CCN)** 3

Examination of problems of terrorism. Includes its historical perspectives; terrorist motivations, organizations, tactics, strategies; role of media; government responses; future trends, prospects. (ND:SS)

**210 Current Politics (CCN)** 3

Study of current national and state political issues.

**215 Problems and Policies in American Government (CCN)** 3

Study of the functioning of American government focusing on the policy process. (ND:SS)

**216 Campaigns and Elections** 3

Examination of political campaigns and elections with special emphasis for voting behavior, history and theory of political advertising, and effectiveness/ethics of negative advertising. Prereq: POLS 115.

**220 International Politics (CCN)** 3

Concepts, theories, and issues in international relations. (ND:SS)

**225 Comparative Politics (CCN)** 3

Comparative analysis of contemporary political systems, practices, institutions, and actors. (ND:SS)

**230 Judicial Process (CCN)** 3

Role of lawyers, judges, and courts in the political system. Special emphasis on judicial decision-making and the ideas behind law.

**240 Political Ideologies (CCN)** 3

Study of ideas, belief systems, and basic principles of ideologies. (ND:HUM)

**325 Applied Research Methods** 4

This course provides an overview of the scientific model, the philosophy and goals of science, and a detailed study of qualitative and quantitative methodologies. Lecture, laboratory. Cross-listed with COMM and CJ.

**350 Gender Issues and the Law** 3

This course examines gender differentiations reflected in the U.S. law from both the historical and contemporary perspectives and the impact of that differentiation, particularly on women, in the areas of employment, education and family law.

**351 Women and Politics** 3

Study of women leaders; their roles and perspectives within a national and international framework.

<b>360 Principles of Public Administration</b> 3	<b>489 Senior Seminar</b> 3	<b>322 Thinking and Making Decisions</b> 3
Empirical study of public administrators in their diverse roles and functions.	Capstone experience. Emphasis on integrative skills needed to interrelate the concepts of the discipline.	Covers the functional uses of critical thinking. Focuses on uses in problem solving and decision-making. Applications are directed at both personal and professional concerns. Prereq: PSYC 111.
<b>420/620 Political Behavior — Executive-Legislative Process</b> 3	<b>720 Theoretical Perspectives to the Study of Political Science</b> 3	<b>350 Research Methods I</b> 3
Behavioral study of executives and legislators with emphasis on examination of empirical data.	Designed to guide beginning graduate students through the dominant paradigms and emerging subject areas of political science scholarship.	Introduction to scientific method, ethics, principles of observation, measurement, survey research, and correlation. Laboratory training on conducting research, analyzing data, and preparing research reports. Prereq: PSYC 111, MATH 103, CSCI 114. Coreq: STAT 330.
<b>421/621 Political Behavior — Political Parties</b> 3	<b>PSYCHOLOGY (PSYC)</b>	<b>351 Research Methods II</b> 3
Behavioral study of political leaders with emphasis on examination of empirical data.	Rokke, Chair; Blakeslee, Brady, Coleman, Council, Friesen, R. Gordon, W. Gordon, Hilmert, Hinsz, Langley, McCaul, McCourt, Nawrot, O'Neill, Rainville, Robinson, Teder-Sälejärvi, Wittrock	Experimental and quasi-experimental designs in psychological research. Laboratory includes performance of experiments, data analysis, and preparation of research reports. Prereq: PSYC 350.
<b>422/622 State and Local Politics</b> 3	<b>COURSES</b>	<b>360 Animal Behavior</b> 3
This course is designed to guide students through a discovery of American politics at the sub-national level. From a comparative perspective, students examine differences between states in terms of their political structures, behavior, and environments. Prereq: Junior standing.	<b>111 Introduction to Psychology (CCN)</b> 3	See Biological Sciences (Zoology) for description.
<b>430/630 Constitutional Law — Civil Liberties</b> 3	<b>210 Human Sexuality</b> 3	<b>370 Forensic Psychology</b> 3
Examination of First Amendment rights including freedom of speech, press, religion, association, and assembly. Due process and equal protection concerns are also addressed.	Survey of biological, developmental, and psychological aspects of human sexuality. Prereq: PSYC 111. Cross-listed with HNES.	Broad overview of the interactions of psychology and the law, including current areas of practice, assessment, and forensic techniques. Special focus upon psychology as applied to and affected by family, civil, and criminal law. Prereq: PSYC 270.
<b>431/631 Constitutional Law — Criminal Justice</b> 3	<b>211 Introduction to Behavior Modification</b> 3	<b>380 Clinical Psychology</b> 3
Study of Fourth, Fifth, and Sixth Amendment rights. Emphasis on the law of arrest, search and seizure, self-incrimination, and right to counsel.	Basic principles and procedures governing acquisition, maintenance, and change of behavior, emphasizing human applications. Laboratory involves designing, implementing, and reporting an individual project. Prereq: PSYC 111.	Introduction to the science and practice of clinical psychology. Includes a survey of the assumptions on which clinical methods are based and an overview of clinical assessment and treatment techniques. Prereq: PSYC 270.
<b>442/642 Global Policy Issues</b> 3	<b>212 Psychological Aspects of Drug Use and Abuse</b> 3	<b>381 Understanding Suicide and its Impact (CCN)</b> 3
Analysis of the impact of planetary limits to growth, increasing globalization of the world economy, and changing control over resource systems on global politics.	Examination of legal and illegal psychoactive drugs. Emphasis on psychological, physiological, and behavioral effects of these drugs and problems of drug abuse. Prereq: PSYC 111. Cross-listed with HNES.	Overview of current understanding of the dynamics of suicide and its impact upon people left behind following the death.
<b>444/644 International Law</b> 3	<b>214 Social Interaction</b> 3	<b>382 Self-Injury: Recognition and Treatment (CCN)</b> 3
Examines the history and foundation of the international legal system, including custom, treaties, jurisdiction, and the relationship between international and municipal law. Prereq: POLS 220.	See Sociology for description. (ND:SS)	Overview of the current understanding of the dynamics of self injurious behavior, of the prevalence of various types of harmful behavior, and of the populations most at risk.
<b>445/645 Ethnic Conflicts</b> 3	<b>221 Psychology in Business and Industry</b> 3	<b>385 Psychology on Film</b> 3
Explores numerous topics and cases related to ethnic conflicts, including the nature of ethnic identity, the causes of ethnic conflicts, and ethnic conflict prevention/resolution.	Applications of psychology to work/business. Topics include personnel selection/placement, job satisfaction and morale, motivation, leadership, group performance, and organizational theory/development. Prereq: PSYC 111. (ND:SS)	Many important issues and topics in psychology have been portrayed in feature films and documentaries. Movies and associated readings present significant concepts, persons, and historical events in psychology. Primary focus is on clinical psychology. Prereq: PSYC 111.
<b>450/650 Politics of the Developing Countries</b> 3	<b>250 Developmental Psychology (CCN)</b> 3	<b>440/640 Experimental Methods</b> 3
Comparative examination of the government and politics of developing countries. Attention is given to special economic and cultural circumstances facing the political systems of these countries.	Survey of the psychology of human life span development. Coverage also includes heredity and prenatal development. Prereq: PSYC 111. (ND:SS)	Intermediate experimental design and data analysis with emphasis on the analysis of variance. Laboratory includes data analysis on the computer. Prereq: PSYC 351, STAT 331.
<b>451/651 Politics of the Industrialized Countries</b> 3	<b>260 Introduction to Neuroscience</b> 3	<b>453/653 Organizational Psychology</b> 3
Comparative study of government and politics in the industrialized countries including the analysis of legislative and executive branches, parties, bureaucracies, constitutions, policies, and voting behavior.	An introduction to behavioral neuroscience with an emphasis on what we know about human brain function and what it means for studying and understanding complex human behavior. Prereq: PSYC 111.	Survey of topics related to application of psychology to organizational settings. Emphasis on theoretical bases of the individual (motivation, satisfaction) and social (leadership, work group) factors involved in work behavior. Coreq: PSYC 351.
<b>452/652 Comparative Political Economy</b> 3	<b>270 Abnormal Psychology (CCN)</b> 3	<b>460/660 Sensation and Perception</b> 3
Comparative study of the relationship between politics and the economy in industrialized and developing countries. Topics include elections, trade, development, investment, redistribution, and the political business cycle.	Survey of the classification, symptoms, and etiology of psychological disorders. Attention given to diagnosis, etiology, and treatment according to prominent theoretical perspectives. Focus on empirical basis for understanding these problems. Prereq: PSYC 111. (ND:SS)	Explores physical, anatomical, and physiological bases of sensation and perception and their psychophysical measurement. Laboratory experiments complement lectures and demonstrate various experimental techniques and sensory phenomena. 2 lectures, equivalent of 2-hour laboratory. Prereq: PSYC 351.
<b>453/653 Environmental Policy/Politics</b> 3	<b>280 Introduction to Health Psychology (CCN)</b> 3	
Course is designed to provide students with both a general and advanced understanding of environmental issues. Will examine philosophical underpinnings informing environmental policy making as well as analyze various substantive environmental issues in US.	Describes the interaction of psychology and health, including the ways in which thoughts, emotions, and behavior influence one's health. Prereq: PSYC 111.	

<b>461/661 Memory and Knowledge</b> 3	<b>481/681 Health Psychology</b> 3	<b>761 Applied Research Methods</b> 3
Examination of current behavioral and neuropsychological research and theory in the area of memory and knowledge representation. Various cognitive phenomena are demonstrated and relevant design issues are highlighted via laboratory experiments. Prereq: PSYC 351.	Application of behavioral procedures to the prevention, treatment, and rehabilitation of medical disorders. Emphasis on contemporary research findings. Prereq: PSYC 350.	Experimental methodology and design skills useful in clinical research including N=1 designs, experimental, and quasi-experimental designs. Laboratory includes reports on recent research articles, presentations on specific content areas, and development of a detailed research proposal.
<b>463/663 Experimental Development Psychology</b> 3	<b>486/686 Neuropsychology</b> 3	<b>762 Advanced Research Methods and Analysis</b> 3
Examination of historical and contemporary theory and research in social and cognitive development. Topics include attachment, adolescent risk-taking, theories of intelligence, and meta-cognition. Laboratory experiences illustrate methods of investigating psychological development. Prereq: PSYC 351.	Introduction to human neuropsychology with emphasis on the neural basis of motor, perceptual, cognitive, emotive, and language behavior. Topics include normal and pathological conditions from clinical and experimental perspectives. Prereq: PSYC 351.	Advanced experimental design and data analysis. Emphasis on regression models as applied to psychological data and designs. Includes analysis on the computer. Lecture, laboratory. Prereq: PSYC 640.
<b>464/664 Attention and Thinking</b> 3	<b>489 Honor Thesis</b> 2-6	<b>764 Advanced Topics in Attention</b> 3
Examines current behavioral and neuropsychological research and theory in the area of attention and thought processes. Laboratory experiments will demonstrate various attentional phenomena and highlight relevant design issues.	Capstone experience option.	Examines prominent theories of attention and empirical evidence in support of those theories. Included topics focus on the role of attention in thought, perception, and action.
<b>465/665 Psychobiology</b> 3	<b>718 Visual Neuroscience</b> 3	<b>770 Advanced Psychological Assessment</b> 3
Fundamental anatomy (structure) and physiology (function) of the nervous system. Physiological bases of behavior. 2 lectures, equivalent of 2-hour laboratory. Prereq: PSYC 351.	A detailed survey of current ideas, methods, and perspectives in visual neuroscience.	Comprehensive approach to assessment in clinical psychology. Includes administration, interpretation, and report writing. Primary focus on Wechsler intelligence scales and personality testing by objective and projective methods.
<b>468/668 Personality</b> 3	<b>720 Cognitive Neuroscience</b> 3	<b>771 Social/Health Psychology Research</b> 3
Study of complex human behavior with attention to historically significant theories and current empirical issues. Laboratory experiences illustrate methods of investigating individual differences. Prereq: PSYC 351.	Examines prominent theories, research approaches, and experimental findings in the field of cognitive neuroscience. Included topics are methodological issues and cognitive neuroscience approaches to research questions in a broad range of areas within cognitive psychology.	Covers research designs frequently utilized in conducting social psychology related research with particular emphasis on health psychology.
<b>470/670 Experimental Social Psychology</b> 3	<b>727 Advanced Topics in Visual Perception</b> 3	<b>782 Emotions</b> 3
Examination of historical and contemporary theory and research in social psychology. Study of the relationship between the individual and social context. 2 lectures, equivalent of 2-hour laboratory. Prereq: PSYC 351.	Integrated overview of the field of vision research. Addresses recent developments in the study of the phenomenology, psychophysics, and neural substrates of human visual sensation and perception. Prereq: PSYC 460.	Focused on basic questions about defining emotions, differences in experiencing or expressing emotions, and relatedness to cognition. Includes emotions and psychotherapy, emotions in a social context, and the impact of emotional expressions versus repression on health.
<b>471/671 The Psychology of Aging</b> 3	<b>731 Fundamental Processes in Cognition</b> 3	<b>787 Advanced Social Psychology and Health</b> 3
Survey of cognitive and psychosocial development in adulthood and old age, including psychopathologies of old age. Contemporary research findings are emphasized. Prereq: PSYC 111, Junior standing.	Explores the underlying architecture of the human cognitive system—how it takes in, processes, stores, and retrieves information.	Covers theory and research from social psychology that has implications for health behavior. Emphasizes theories of attitudes and behavior applied to such topics as regimen adherence, self-protective health behavior, and disease prevention. Prereq: PSYC 670, 681.
<b>472/672 Advanced Psychopathology</b> 3	<b>732 Applied Cognitive Processes</b> 3	<b>RADIOLOGIC SCIENCES (RS)</b>
In-depth coverage of recent research on diagnosis, etiology, and maintenance of behavior disorders emphasizing the interaction of biological, behavioral, and social factors. Prereq: PSYC 270, Junior standing.	Explores the ways cognitive principles operate in ecologically valid (real-world) situations.	P. Olson
<b>473/673 Child Psychopathology and Therapy</b> 3	<b>733 Judgment and Decision Making</b> 3	<b>COURSE</b>
Overview of the etiology and treatment of behavior disorders in children and adolescents. Emphasis on recent research findings and behavioral intervention strategies. Prereq: PSYC 270 or 351.	Explores issues and topics related to judgment and decision-making.	<b>111 Introduction to Radiologic Sciences</b> 1
<b>474/674 Behavior Analysis in Developmental Disabilities</b> 3	<b>735 Neural Networks</b> 3	Lectures, discussions, and field trips focus on professional traits, ethical behavior of the health care provider, major curriculum requirements, and scope of practice.
Overview of developmental disabilities with emphasis on mental retardation. Application of behavior analysis procedures for skills training, functional assessment and treatment of problem behaviors and staff management. Students participate in assessment and treatment projects. Prereq: PSYC 211.	See Computer Science for description.	<b>RELIGIOUS STUDIES (RELS)</b>
<b>480/680 History and Systems</b> 3	<b>750 Introduction to Clinical Issues and Practices</b> 1	Helgeland
Historical development of scientific psychology. Emphasis on the development of various systems of psychology in America. Capstone experience. Prereq: PSYC 351 or Senior standing.	Instruction and practice in clinical interview techniques and discussion of clinical issues including ethics, laws, and crisis intervention.	<b>COURSES</b>
	<b>755 Behavior Therapy and Assessment I</b> 4	<b>100 Introduction to Religion (CCN)</b> 3
	Introduction to the nature and characteristics of behavioral assessment and behavior therapy. Laboratory includes behavioral interviewing and training in assessment and treatment procedures.	Introduction to the ways religious concerns are expressed, to religious values as a basis for human action, and to a spectrum of ethical styles. (ND:HUM)
	<b>756 Behavior Therapy and Assessment II</b> 4	<b>210 Ethics</b> 3
	In-depth coverage of behavioral assessment and treatment approaches, emphasis on their empirical status. Laboratory includes instruction with practice in implementation of these procedures. Prereq: PSYC 755.	See Philosophy for description.
	<b>760 Research Methods in Visual and Cognitive Neuroscience</b> 3	<b>220 Old Testament (CCN)</b> 2
	This course provides both theoretical and practical training in methodological skills essential for the conduct of high-quality research in the field of visual and cognitive neuroscience. May be repeated with change in topic.	Study of the religious, political, and social history of ancient Israel as reflected in the Hebrew Bible.

<b>230 New Testament (CCN)</b>	3
Overview of the developments in the primitive Christian community as reflected in the New Testament.	
<b>243 Religion and Self (CCN)</b>	3
Psychological and ethical issues involved in growth to religious maturity. Attention to basic human activities such as love, faith, marriage, sexuality, death, and grief.	
<b>270 American Religious History (CCN)</b>	3
Introduction to the basic issues in American history including the study of Puritans, immigration, church and state, revivalism, civil and military religion, apocalypticism, and new age religion. Cross-listed with HIST.	
<b>315 Contemporary Religion</b>	3
Study of how contemporary cultural developments require the rethinking of historic religious perspectives in such topics as natural science, political thought, psychology, history, and gender.	
<b>320 History of Christianity</b>	3
Major developments in the Christian religion including scriptures, persecution, monasticism, papacy, Reformation, science and religion, and the ecumenical movement. Cross-listed with HIST.	
<b>401 Sociology of Religion</b>	3
See Sociology for description.	
<b>453 Magic and Religion</b>	3
See Anthropology for description.	

## RESPIRATORY CARE (RC)

P. Olson

### COURSE

<b>111 Introduction to Respiratory Care</b>	1
Introduction to the profession of respiratory care. Lectures, discussions, and field trips focus on professional traits and communication, ethical behavior of the health care provider, major curriculum requirements, and scope of practice.	

## SOCIOLOGY (SOC)

Klenow, Chair; Corwin, Goreham, Klenow, Rathge, Slobin, Weber, Youngs

### COURSES

<b>110 Introduction to Sociology (CCN)</b>	3
Introductory analysis of the nature of society, the interrelationship of its component groups, and the process whereby society persists and changes. (ND:SS)	
<b>115 Social Problems (CCN)</b>	3
Sociological analysis of major social problems.	
<b>150 Cornerstone in Sociology</b>	3
This course provides an integrative in-depth survey of the discipline of sociology for sociology majors only. The course will focus on the core areas of the discipline as well as subdiscipline areas. Prereq: SOC 110.	
<b>202 Minorities and Race Relations</b>	3
Analysis of lifestyles and characteristics of racial, cultural, and ethnic groups in society. Review of processes of discrimination, prejudice, and related dehumanizing biases toward minority groups including women. Prereq: SOC 110. (ND:SS)	
<b>214 Social Interaction</b>	3
Examination of issues relevant to the study of individual behavior (e.g., self-concept, attitudes, social perception) in a social context. Cross-listed with PSYC. (ND:SS)	

<b>233 Sociology of Organizations and Work</b>	3
This course examines major types of organizations, their goals, and characteristics. The course focuses on social issues as they relate to organizations and work.	
<b>340 Social Research Methods</b>	3
Overview of the scientific method, the philosophy of science, and the goals of science. Detailed study of qualitative and quantitative methodologies. Cross-listed with COMM.	
<b>341 Social Research Methods Laboratory</b>	1
Laboratory to accompany SOC 340. Provides application of conceptualization, operationalization, sampling methods, qualitative and quantitative research methods, and computer statistical analysis. Cross-listed with COMM.	
<b>401/601 Sociology of Religion</b>	3
Study of religion viewed as a social institution with a characteristic history, ecology, structure, behavior, and purpose. Cross-listed with RELS.	
<b>403/603 Sociology of the Great Plains</b>	3
Social and cultural patterns, trends, and problems peculiar to life in the semi-arid Great Plains.	
<b>405/605 Community Development</b>	3
Study of communities viewed as social systems. Includes political, economic, social, and economic factors affecting community growth and decline. Community development methods are addressed.	
<b>407/607 Deviant Behavior</b>	3
See Criminal Justice for description.	
<b>410/610 Social Inequality</b>	3
Analysis of social and economic inequities and investigation of the relationship between inequity and life chances.	
<b>412/612 Sociology of Sex Roles</b>	3
The socialization of men and women; an analysis of institutional norms, values, and attitudes and their effects on gender role development. Prereq: SOC 110.	
<b>416 Sociology Through Literature</b>	3
Study of basic concepts of sociology as illustrated in selected literature from 19 <sup>th</sup> and 20 <sup>th</sup> century English, American, French, and Russian novels. Prereq: SOC 110.	
<b>417/617 Sociology of the Family</b>	3
Comparative family types, member relationships, family dynamics in relation to personality, social change, and social values.	
<b>418/618 Social Psychology</b>	3
Examination of both historical and contemporary research and theory in social psychology—the study of the relationship between the individual and the social context. Prereq: SOC 110.	
<b>420 Sociology of Disaster</b>	3
Examination of natural and human-made disasters, stages of a disaster, social impacts of a disaster, and community, organizational, and governmental responses to disaster. Explores U.S. and cross-cultural disaster research.	
<b>422/622 Development of Social Theory</b>	3
Sociological theories and systems from Comte, Marx, Durkheim, and Weber through the 20 <sup>th</sup> century. Prereq: SOC 110.	

<b>424/624 Feminist Theory and Discourse</b>	3
Historical overview of feminist ideas and major writings from the 18 <sup>th</sup> century to the present, which includes issues related to women's personal, social, and public lives.	
<b>426/626 Sociology of Medicine</b>	3
Analysis of the social aspects of health and illness, the health care professions, organization of health care, and related issues.	
<b>431/631 Environmental Sociology</b>	3
Examines the interactions between the biophysical environment and human society, how social processes define, construct, and threaten the environment, and the human causes and consequences of environmental problems and their solutions.	
<b>439/639 Social Change</b>	3
Analysis of the complex nature of social change in communities, the nation, and internationally. Prereq: SOC 110.	
<b>440/640 Sociology of Aging</b>	3
Examination of sociological perspectives on aging. Topics include social theories of aging, retirement, long-term care, chronic illness, and death.	
<b>441/641 Sociology of Death</b>	3
Examination of research on social psychological and social organizational dimensions of death and dying. Additional topics include hospice movement, grief and bereavement, and communicating death news.	
<b>443/643 International Disasters</b>	3
Impacts of natural and human-made disasters on industrialized and developing societies; relief and reconstruction post-disaster programs.	
<b>445/645 Special Populations in Disasters</b>	3
Identification of special populations and their needs that arise in emergency or disaster situations both in industrialized and developing countries.	
<b>465/665 Applied Demographics</b>	3
Overview of demographic concepts and principles and their application to business and planning decisions. Emphasis on using databases and information sources available on the Internet.	
<b>489 Senior Capstone in Sociology</b>	1
Synthesis of social research methods, sociological theory, and sub-discipline content material. Emphasis on integrative skills needed to interrelate the basic concepts of the discipline. Prereq: SOC 340 or Senior standing.	
<b>700 Qualitative Methods</b>	3
Advanced analysis of the methods used in qualitative research projects such as intensive interviewing, focus groups, and participant observation. Prereq: SOC 340.	
<b>701 Quantitative Methods</b>	3
Advanced analysis of the methods used in quantitative research projects, such as survey design, experimental design, and evaluation research. Prereq: STAT 330 or 725, SOC 340.	
<b>723 Social Theory</b>	3
Examination of contemporary social theories and theory construction. Prereq: SOC 422/622.	

**SOIL SCIENCE (SOIL)**

Lym, Interim Chair; Casey, Cihacek, Enz, Franzen, Goos, Hopkins, Overstreet, Prunty

**COURSES****210 Introduction to Soil Science (CCN) 3**

Physical, chemical and biological properties of soils, as related to use, conservation and plant growth. 2 lectures, 1 laboratory, including field trip. F,S

**217 Introduction to Meteorology and Climatology (CCN) 3**

Basic meteorology-climatology concepts and their application; includes energy balance, greenhouse effect, temperature, pressure systems, lows, highs, fronts, winds, clouds, storms, humidity, precipitation, and measurements. Lectures, discussions, demonstrations. S (ND:SCI)

**321 Soil Management and Conservation (CCN) 3**

Principles of soil management and conservation practices relating to sustainable cropping and tillage systems, government programs, erosion reduction practices, government support programs, and preservation of natural resources. 3 lectures. Recommended: SOIL 210. F

**322 Soil Fertility and Fertilizers (CCN) 3**

Principles of plant nutrition and soil nutrient availability; soil testing and fertilizer recommendations and management. Macronutrient emphasis. 3 lectures. Prereq: SOIL 210, CHEM 121, 121L. S

**333 Managing Soil Physical Properties 2**

Study of principles and measurement of soil physical properties: density, texture, structure, aggregation, compaction, porosity, water content, water characteristic, hydraulic conductivity. 2 lectures. Prereq: SOIL 210. F

**339 Managing Soil Physical Properties Laboratory 1**

Sampling and measurement procedures for determination of various soil physical properties. 1 two-hour laboratory, plus arrangement. Prereq: SOIL 210. Coreq: SOIL 333. F

**410/610 Soil and the Environment 2**

Soil as part of the ecosystem, soil classification, land use, waste disposal, environmental quality. 2 lectures. Prereq: Junior standing, 6 credits of physical or biological sciences. Not acceptable for graduate credit for Soil Science majors. S

**444/644 Soil Genesis and Survey 4**

Introduction to soil development, morphology, and survey. Soil classification, geography, and their interpretation will be highlighted by evaluating physical and chemical soil properties and their distribution at the landscape scale. 3 lectures, 1 three-hour laboratory (includes several field trips). Prereq: SOIL 210. F

**447/647 Microclimatology 3**

Characteristics and causes of the climate near the ground and its interaction with living organisms. Energy and mass transfer concepts. Lectures, discussions, demonstrations. Prereq: PHYS 211. S (even years)

**455/655 Soil Chemistry 3**

Soil chemical reactions and equilibria, solubility relationships, mineral weathering, cation and anion adsorption, redox reactions, metal chelation, and fixation of nutrients in the soil. 3 lectures. Prereq: SOIL 322, CHEM 122, 122L. F (odd years)

**465/665 Soil and Plant Analysis 3**

Laboratory analytical techniques for chemical characterization of soils and determining elemental composition of soils and plant materials for plant nutrition and environmental purposes. 1 lecture, 2 laboratories. Prereq: SOIL 210, CHEM 121, 122. S (odd years)

**480/680 Soil and Waste Disposal 2**

Role of soil as a reactor and roles of chemical, physical, hydrological and biological soil properties that influence waste transformation in soil. 2 lectures. Prereq: 16 credits of physical sciences including one year of chemistry, Senior standing. S (even years)

**763 Soil Physics 3**

Composition of soil in terms of solid, liquid, and gaseous phases. Theory of water, heat, and solute transport processes. Water availability for plant growth. 2 lectures, 1 laboratory. Prereq: SOIL 339, PHYS 211, MATH 146 or 165. S (even years)

**782 Advanced Soil Fertility 2**

Advanced study of soil-plant-nutrient relationships with emphasis on concepts of soil fertility, ion absorption, nutrient transformation, and interpretation of experimental data. 2 lectures. Prereq: SOIL 455/655. F (even years)

**784 Advanced Soil Genesis, Morphology and Classification 2**

Advanced study of processes of soil development, soil morphology, and principles of soil classification. 2 lectures (field trip and laboratory by arrangement). Prereq: SOIL 444/644. F (even years)

**785 Advanced Soil Chemistry 2**

Advanced study of chemical properties of soil. 2 lectures. Prereq: SOIL 455/655. S (even years)

**SPANISH (SPAN)**

Hawley, Pearson, Soria-Dufner, Stickney

**COURSES****101, 102 First-Year Spanish I, II (CCN) 4 each**

Basic structures and vocabulary of Spanish. Practice in the fundamentals of listening, speaking, reading, and writing. No previous knowledge of Spanish required. (ND:HUM)

**201, 202 Second-Year Spanish I, II (CCN) 3 each**

Emphasis on developing proficiency in the four language skills. Review of grammar, practice in composition, and cultural and literary readings. Prereq: SPAN 102. 201: (ND:HUM)

**311, 312 Spanish Conversation and Composition I, II 3 each**

Advanced practice to develop greater proficiency in oral and written skills through the study of cultural and literary readings. Prereq: SPAN 202.

**330 [315] Introduction to Spanish Civilization 3**

Introduction to the social, political and cultural history of Spain. Taught in Spanish. Prereq: SPAN 312.

**331 Introduction to Spanish American Civilization 3**

Introduction to the social, political and cultural history of the Spanish-speaking Americas. Taught in Spanish. Prereq: SPAN 312.

**401 Advanced Spanish Grammar and Writing 3**

Writing practice with primary focus on form, syntax, and style. Taught in Spanish. Prereq: SPAN 312.

**402 Advanced Spanish Conversation 3**

Advanced practice to develop greater oral proficiency through the analysis and discussion of cultural and literary texts. Prereq: SPAN 312.

**440 [411] Traditions in Spanish American Literature 3**

Representative works from the pre-conquest era to the 21<sup>st</sup> century. Overview of literary movements, genres, and cultural background. Taught in Spanish. Prereq: SPAN 312.

**441 [412] Contemporary Spanish American Literature 3**

Developments and techniques in contemporary texts through representative works. Overview of cultural, historical, and socio-political aspects, as well as literary background. Taught in Spanish. Prereq: SPAN 312.

**442 Chicano Literature 3**

From 19<sup>th</sup> century californios, to the Chicano Renaissance and nationalism, as well as contributions from Chicana writers. Taught in Spanish. Prereq: SPAN 312.

**450 [410] Traditions in Spanish Literature 3**

Representative works of the literature of Spain from its epic beginnings to the contemporary period. Overview of literary movements, genres, and cultural background. Taught in Spanish. Prereq: SPAN 312.

**451 Contemporary Spanish Literature 3**

Representative works of the literature of Spain from modernity forward. Overview of literary movements, genres, and cultural background. Taught in Spanish. Prereq: SPAN 312.

**452 Cervantes 3**

Study of representative works by Miguel de Cervantes, including Don Quixote. Taught in Spanish. Prereq: SPAN 312.

**489 Senior Thesis 1-6**

Capstone experience option. Research and original investigation under the guidance of a faculty member. Student work to be written in Spanish.

**STATISTICS (STAT)**

R. Magel, Chair; Bhandary, Degges, Rao (Emeritus), Terpstra

**COURSES****330 Introductory Statistics 3**

Frequency tables, histograms, probability, well-known probability distributions, one and two sample tests of hypotheses, confidence intervals, and contingency tables. Prereq: MATH 103, 104, or 107. (ND: MATH)

**331 Regression Analysis 2**

Simple and multiple regression techniques and correlation coefficients. Emphasis on applications. Prereq: STAT 330.

**367 Probability 3**

Probability, probability distributions for discrete random variables, probability density functions, marginal joint probability density functions, expected value and variance, and transformations. Prereq: MATH 166.

**368 Statistics 3**

Moments, moment generating functions, central limit theorem, one and two sample tests of hypotheses, estimation, and simple linear regression and correlation. Prereq: STAT 367.

- 450/650 Stochastic Processes** 3  
Discrete time Markov chains, Poisson processes, continuous time Markov chains, birth and death processes, renewal processes, branching processes, queuing systems, and applications. Prereq: STAT 368.
- 451/651 Bayesian Statistical Decision Theory** 3  
Bayesian approach to statistics including utility and loss, prior and posterior densities, and Bayesian inference. Comparisons with classical statistical methods. Prereq: STAT 368 or 468.
- 460/660 Applied Survey Sampling** 3  
Simple random, stratified, systematic and cluster sampling; two-stage sampling. Estimation of population means and variances. Ratio and regression estimators. Prereq: STAT 330 or 368.
- 461/661 Applied Regression Models** 3  
Simple linear regression, matrix approach to multiple regression, and introduction to various tests and confidence intervals. Includes discussion of multicollinearity and transformations. Prereq: STAT 330 or 368, knowledge of matrix algebra.
- 462/662 Introduction to Experimental Design** 3  
Fundamental principles of designing an experiment, randomized block, Latin square, and factorial. Also covers analysis of covariance and response surface methodology. Prereq: STAT 330 or 368.
- 463/663 Nonparametric Statistics** 3  
Various tests and confidence intervals that may be used when the underlying probability distributions are unknown. Includes the Wilcoxon, Kruskal-Wallis, and Friedman. Prereq: STAT 330 or 368.
- 464/664 Discrete Data Analysis** 3  
Application of binomial, hypergeometric, Poisson, mixed Poisson, and multinomial distributions in discrete data analysis. Log-linear models and contingency tables. Logistic regression. Discrete discriminant analysis. Prereq: STAT 368.
- 465/665 Meta-Analysis Methods** 3  
Statistical methods for meta-analysis with applications. Various parametric effect size from a series of experiments: fixed effect, random effect linear models; combining estimates of correlation coefficients; meta-analysis in the physical and biological sciences. Prereq: STAT 331, 461/661, or 725.
- 467 Probability and Mathematical Statistics I** 3  
Random variables, discrete probability distributions, density functions, joint and marginal density functions, transformations, limiting distributions, central limit theorem. Prereq: MATH 265 or STAT 368.
- 468 Probability and Mathematical Statistics II** 3  
Properties of estimators, confidence intervals, hypotheses testing, Neyman-Pearson lemma, likelihood ratio tests, complete and sufficient statistics. Prereq: STAT 467.
- 470/670 Statistical SAS Programming** 3  
Focuses on statistical problem solving and writing SAS computer code. Data types, data management, data input/output, SAS as a programming language, data analysis, report writing, and graphing. Prereq: STAT 461/661, 462/662, or 726.
- 476 Actuary Exam Study II** 1  
Selected material from probability and mathematical statistics in preparation for the national actuarial exam. Prereq: STAT 368 or 468.
- 520 Statistical Methods for Pharmacy** 3  
Descriptive statistics, life tables, probability, binomial and normal distributions, estimation, hypothesis testing, introduction to regression and ANOVA. Examples from the medical/pharmaceutical area. Prereq: MATH 103 or 107.
- 725 Applied Statistics** 3  
Data description, probability, inference on means, proportions, difference of means and proportions, categorical data, regression, analysis of variance, and multiple comparisons. Prereq: Knowledge of algebra. This course is not intended for statistics or mathematics majors.
- 726 Applied Regression and Analysis of Variance** 3  
Simple and multiple regression, ANOVA tables, correlation, regression diagnostics, selection procedures, analysis of covariance, one-way ANOVA, two-way ANOVA. Prereq: STAT 725.
- 730 Biostatistics** 3  
Direct assays, parallel line assays, slope ratio assays, multiple assays, and quantal assays. Model, estimation, and testing. Probit and logit analysis. Prereq: STAT 461/661 or 725.
- 732 Introduction to Bioinformatics** 3  
See Mathematics for description.
- 750 Time Series** 3  
Estimation of trend in time series data. Seasonal models. Stationary models. Moving average, autoregressive, and ARMA models. Model identification. Forecasting. Intervention analysis. Prereq: STAT 468 or 768, 461/661, course in matrix algebra.
- 761 Advanced Regression** 3  
Multiple regression, analysis of residuals, model building, regression diagnostics, multicollinearity, robust regression, and nonlinear regression. Prereq: STAT 468 or 768, 461/661, course in matrix algebra.
- 762 Messy Data Analysis** 3  
One-way classification models with heterogeneous errors. Two-way classification analysis in the unbalanced case. Analysis of mixed models. Split-plot, nested, and crossover designs. Prereq: STAT 462/662.
- 764 Multivariate Methods** 3  
Sample geometry; correlation; multiple, partial, canonical correlation test of hypothesis on means; multivariate analysis of variance; principal components; factor analysis; and discriminant analysis. Prereq: STAT 461/661 or 462/662, course in matrix algebra.
- 767 Probability and Mathematical Statistics I** 3  
Random variables, discrete probability distributions, density functions, joint and marginal density functions, transformations, limiting distributions, central limit theorem. Additional project required. Prereq: MATH 265 or STAT 368.
- 768 Probability and Mathematical Statistics II** 3  
Properties of estimators, confidence intervals, hypotheses testing, Neyman-Pearson lemma, likelihood ratio tests, complete and sufficient statistics. Additional projects required. Prereq: STAT 767.
- 770 Survival Analysis** 3  
Basic methodology in the analysis of Censored Data, two basic types of censoring, parametric estimation, nonparametric estimation, and life table methods. Prereq: STAT 768.
- 774 Linear Models I** 3  
General linear models. Full rank models. Estimation, confidence ellipsoids, and tests of hypotheses. Not full rank models. Applications to regression and design of experiments. Prereq: STAT 768, course in matrix algebra.
- 775 Linear Models II** 3  
Repeated measurements models. Variance components models. Response surfaces. Growth curve models, unbalanced designs. Prereq: STAT 774.
- 777 Multivariate Theory** 3  
Wishart distribution, distribution of Hotelling's T-square and Lambda statistics, cluster analysis, correspondence analysis, principal components, factor analysis, discriminant analysis, multidimensional scaling. Prereq: STAT 764.
- 778 Modern Probability Theory** 3  
Probability theory presented from the measure theoretic perspective. Emphasis on various types of convergence and limit theorems. Discussion of random walks, conditional expectations, and martingales. Prereq: STAT 767, MATH 750. Cross-listed with MATH.
- 780 Asymptotics, Bootstrap, and Other Resampling Plans** 3  
Development of large sample and small sample properties of a variety of estimators. Prereq: STAT 768.
- 786 Advanced Inference** 3  
Further discussion of properties of estimators, theory of estimation, and hypotheses testing. Prereq: STAT 768.
- THEATRE ARTS (THEA)**  
Chabora, Erickson, Horvik, Johnson, Larew, Lifton, Varland
- COURSES**
- 110 Introduction to Theatre Arts (CCN)** 3  
Basic orientation and historical perspective to the art of theatre. Includes the spectrum of dramatic literature, theatrical production, and performance. (ND:HUM)
- 115 World Film** 3  
Study of the development and practice of the art of film and its relationship to the theater emphasizing performance and production angles. (ND:HUM)
- 161 Acting I (CCN)** 3  
Beginning actors are introduced to basic mental and physical performance skills, stage conventions, and scene work. Emphasis on enhancing the student's spontaneity, imagination, and awareness. (ND:FA)
- 180 Dramatic Literature and Style** 3  
Survey of dramatic literature from the 18<sup>th</sup> century to the present with emphasis on historical and cultural context, production style, and problems inherent in contemporary production. (ND:HUM)
- 200 Introduction to Theatre Practicum** 1  
An introductory required course for freshmen and transfer theatre majors. Lectures and practical applications will introduce students to the requirements of a theatre arts major and, specifically, to THEA 201, Theatre Practicum.
- 201 Theatre Practicum (CCN)** 1  
Participation in various activities connected with the first Little Country Theatre production of current

season. May be repeated. Prereq: THEA 200 or transfer of upper-class standing.		and physical characterization. Prereq: THEA 261. (alternate years)	
<b>202 Theatre Practicum II</b>	1	<b>365 Directing I</b>	3
Participation in various activities connected with the second Little Country Theatre production of current season. May be repeated.		Introduction to the creative process of directing. Focus on script analysis, basic directing tools, and scene work. Prereq: THEA 261.	
<b>203 Theatre Practicum III</b>	1	<b>370 Technical Theatre Production</b>	3
Participation in various activities connected with the third Little Country Theatre production of current season. May be repeated.		Advanced study in technical theatre production. Emphasis on planning processes and individual duties/responsibilities for technicians at all levels of theatrical production. 2 lectures, 1 three-hour laboratory. Prereq: THEA 270, 271. May be repeated.	
<b>204 Theatre Practicum IV</b>	1	<b>371 Technical Drawing</b>	3
Participation in various activities connected with the fourth Little Country Theatre production of current season. May be repeated.		Introduction to hand drafting and computer-assisted drafting techniques. Emphasis on acquisition of skills to produce technical drawings for theatrical scenic and lighting design.	
<b>261 Acting II (CCN)</b>	3	<b>372 Stage Management</b>	3
Practical application of fundamental skills to textual work. Prereq: THEA 161.		Fundamentals of production stage management. Emphasis on the role, duties, and relationships of the stage manager as a member of the production team.	
<b>266 Voice and Movement for the Actor</b>	3	<b>375 Introduction to Stage Design</b>	3
An introduction to the theory and practice of ideal vocal production and physical self-use. Exercises are offered addressing breath control, alignment, relaxation, resonance, articulation, projection, and expansion of physical and vocal creative expression. Prereq: THEA 161.		See department for description.	
<b>270 Stagecraft (CCN)</b>	3	<b>377 Lighting for the Stage</b>	3
Introduction to the crafts and technologies of theatre production. Includes fundamentals of scenery construction, tool usage, safety, and basic rigging. 2 lectures, 1 two-hour laboratory.		Advanced study in stage lighting. Emphasis on design, planning processes, and implementation of lighting into theatrical productions. 2 lectures, 1 three-hour laboratory. Prereq: THEA 270.	
<b>271 Costume Construction</b>	3	<b>378 Sound Design</b>	3
Introduction to costuming. Construction, alteration, and acquisition of costumes and costume accessories. 3 lectures, 1 two-hour laboratory.		Advanced study in stage sound design. Emphasis on aesthetics, collaborative and planning processes, and implementation of sound into theatrical productions. 2 lectures, 1 three-hour laboratory. Prereq: THEA 270.	
<b>275 Makeup Design I</b>	3	<b>440 Advanced Projects in Production</b>	3
Fundamentals of stage makeup. Facial analysis and introduction to materials and techniques. Elementary character interpretation through two-dimensional application.		Advanced projects in acting, directing, and technical theatre. May be repeated. Prereq: THEA 370.	
<b>276 Makeup Design II</b>	3	<b>450 Capstone Experience</b>	3
Advanced study in makeup techniques and application, including prosthetics. More advanced character interpretation through three-dimensional application. Concludes with major makeup projects. Prereq: THEA 275.		Demonstration of mastery in selected area of theatre through an advanced project in acting, directing, design/technical theatre, or dramaturgy. Departmental capstone experience. Prereq: Senior standing.	
<b>280 World Theatre</b>	3	<b>461 Acting Styles: Verse Drama</b>	3
Survey of the theatre and drama of various European and non-Western cultures. (ND:HUM)		Advanced training in classical acting focusing on effective vocal/rhetorical techniques, and on the use of poetic rhythm and imagery in creating a role. Exploration of Style/Language Analysis, Greek, Commedia, Elizabethan, and Comedy of Manners/Morals. Prereq: THEA 261, 266. Recommended: THEA 466, 480. F (even years).	
<b>301 Musical Theatre Troupe</b>	1	<b>462 Acting Styles: Mod/Contemp Non-Realism</b>	3
A select performance ensemble of 12-16 students. Students will develop and present scenes, songs, and choreography from contemporary musical theatre productions. By audition and permission of instructor. May be repeated.		Introduction to various major non-realistic performance styles of the late nineteenth through twentieth centuries. Styles covered include symbolism, expressionism, Brechtian epic theatre, and absurdism, with overview of contemporary non-realistic styles. Prereq: THEA 261.	
<b>350 Studio Theatre</b>	1-2	<b>465/665 Directing II</b>	3
Workshops in specialized techniques or a showcase for individual creativity. Includes projects in acting, directing, design, movement, and play writing. May be repeated.		Problems in directing, formulating production concepts, casting, working with actors, and aiding characterization. Includes preliminary work with thrust and arena staging. Prereq: THEA 365.	
<b>361 Movement for the Actor</b>	2	<b>466 Advanced Voice for the Actor</b>	2
Introduction to basic stage movement techniques. Emphasis on bodily awareness and control, responsiveness, freedom from personal mannerism,		Intensive examination and development of the vocal mechanism. Continuing focus on consonant/vowel	
		production, diction/articulation, resonance/placement, and breath/posture will be complemented by the introduction of IPA, character voices and dialect work. Prereq: THEA 266.	
		<b>467 Advanced Movement for the Actor</b>	2
		An advanced level movement course introducing styles of theatre movement including unarmed stage combat and various idioms of dance (basics in ballet, modern dance, jazz and/or tap.) Prereq: THEA 266.	
		<b>468 The Business of Acting</b>	3
		Selection, preparation, and performance of songs and classical and contemporary monologues for auditions; preparation of professional resume and cover letter; techniques of cold reading; research of theatre companies, union, agencies, and other job search resources. Prereq: Senior standing.	
		<b>475/675 Design for the Stage I</b>	3
		Basic drafting and design techniques for scenic design and technology. Includes script analysis, development of a design concept, and historical perspectives on scene design. 2 three-hour laboratories. Prereq: THEA 375.	
		<b>476/676 Design for the Stage II</b>	3
		Basic drawing and design techniques for costume design and technology. Includes script analysis, development of a design concept, and historical perspectives on clothing and costume design. 2 three-hour laboratories. Prereq: THEA 375.	
		<b>480/680 History and Literature of the Theatre I</b>	3
		Historical study of theatre architecture, staging methods, individual artists, and plays from the theatre's origins through the 17 <sup>th</sup> century. Prereq: THEA 180. (alternate years)	
		<b>481/681 History and Literature of the Theatre II</b>	3
		Historical study of theatre architecture, staging methods, individual artists and plays from the 18 <sup>th</sup> century to the present. Prereq: THEA 480/680. (alternate years)	
		<b>TRANSPORTATION &amp; LOGISTICS (TL)</b>	
		Bilen-Green, Lambert, Tolliver, Traub, Varma	
		<b>COURSES</b>	
		<b>711 Logistics Systems</b>	3
		Covers foundation material on topics critical to establishing effective supply chains. Topics include inventory theory, forecasting, aggregate planning, quality management, and project management. Material is presented with appropriate military applications.	
		<b>713 Global Value Chain Management</b>	3
		An overview of supply chain theory with a focus on military applications. Covers the basics of supply chain management including processes within both the internal and external supply chains.	
		<b>715 Enterprise Resource Planning</b>	3
		Covers material essential to the successful implementation of an ERP, addressing enterprise-wide functionality as well as required tactical functions such as project management and project planning, and provides an overview of implementation alternatives.	
		<b>717 Freight Transportation Logistics</b>	3
		This course focuses on the operation and planning of freight transportation modes and facilities, and materials distribution. Topics include: railroad, highway, vessel, and air transportation; container logistics; terminals and cargo-handling; and military transportation.	

**719 Crisis Management and Homeland Security 3**

Provides an integrated approach to crisis response and management within the contexts of military logistics and homeland security. Focus is on problems of natural, technological, and civil hazards, and disasters. The role of technology is emphasized.

**721 International Logistics Management 3**

This course provides a coherent perspective on contemporary global logistics from raw materials through production to the customer. Addresses the roles of governments and intermediaries, international sourcing and the application of local trade laws. Prereq: TL 711, 713, 715, 717, 719.

**723 Advanced Supply-Chain Planning 3**

Continues to develop the concepts introduced in TL 613. Flexible supply chains are considered. By understanding both current capabilities and evolving needs of the enterprise, the appropriate modifications to the supply chain can be identified. Prereq: TL 711, 713, 715, 717, 719.

**725 Technology Advances & Logistics 3**

This course addresses the new technologies that help shape advanced logistics and the advantages that such technologies have brought to end users, suppliers, and a broad spectrum of related industries. Prereq: TL 711, 713, 715, 717, 719.

**727 Organizational Change Management 3**

Change management is the process of making either incremental improvements or radical changes to an organization's operations for the purpose of enhancing both organizational and individual effectiveness. A systems perspective and leadership implications are stressed. Prereq: TL 711, 713, 715, 717, 719.

**729 Adaptive Planning in Logistics 3**

Presents a systems view with a focus on how remote sensing technology enables sense and respond logistics. Topics include organizational structure, strategic alliances, programmed decision making, supply-chain dynamics, and the value of information transparency. Prereq: TL 711, 713, 715, 717, 719.

**731 Logistics Research Methods 3**

This course covers key research concepts including: principles of scientific research, model-building, continuous-dependent variable models, qualitative-dependent variable models, and optimization modes. The emphasis is on applications and problem-solving in Transportation and Logistics. Prereq: TL 721, 723, 725, 727, 729.

**733 Military Logistics Case Studies 3**

This course will consist of case analysis based primarily on events from Operation Iraqi Freedom. Topics from courses within the military logistics curriculum are integrated into the cases. Prereq: TL 721, 723, 725, 727, 729.

**782 Transportation Systems I 3**

Interdisciplinary concepts and models including: relationships between transportation, the economy, environment, and land use; freight transportation demand; logistics planning; railroad technology, capacity, and infrastructure; railroad planning and regulation; maritime transportation, ports, and cargo handling. Prereq: MATH 265.

**783 Transportation Systems II 3**

Barge, pipeline, and highway transportation, including: river and lake movements, inland waterway planning,

lock performance analysis, pipeline networks and technology, highway capacity and finance, truck size and weight policies, and highway planning models. Prereq: TL 782.

**784 Intermodal Freight Transportation 3**

Intermodal freight transportation modes. Container handling and logistics. Rail, highway, and ocean vessel equipment. Terminals and cargo-handling procedures. Landside and port issues. Documentation and liability. Intermodal information systems. Policy, regulatory, and financial issues. Prereq: MATH 265.

**785 Spatial Analysis of Transportation Systems 4**

Theories and models of spatial interaction between transportation and land use including: transportation and spatial organization of production and cities; networks and transportation costs; location theories; interaction and optimization models; GIS concepts and applications. Prereq: TL 782.

**786 Public Transportation 3**

History and development of transit. Transit modes. Transit facilities. Services planning. Routing and scheduling. Demand forecasting. Intelligent Transportation Systems. Transit and urban land use. Rural transit systems. Intercity rail passenger service. Policy and management.

**788 Research in Transportation and Logistics 3**

Strategic research issues in Transportation and Logistics. Foundations of research philosophies and methodologies. Research design. Research problem and objective statements. Research methods in Applied Economics, Supply Chain Management, and Transportation Infrastructure Planning. Interdisciplinary synthesis. Prereq: TL 782.

**UNIVERSITY STUDIES (UNIV)****COURSES****189 Skills for Academic Success 1**

Development of skills and techniques for academic success. Includes study techniques, time management, test taking, note taking, goal setting, wellness, stress management, and career orientation. Introduction to campus resources and governance. Repeated course opportunity exists for failing grades only. Cross-listed with ABEN, AGRI, BUSN, HD&E, and ME.

**402 Power of Narrative 3**

Examination of the power of narrative in family stories from the viewpoint of literature, anthropology, and family studies. Exploration of the formation and basis for individual, family, and cultural identity through stories.

**403 Weighing the Evidence 3**

Examination of evidence from a variety of viewpoints representing different academic disciplines and vocations. Incorporation of a broader perspective in increasingly complex situations.

**404 Spatial Conflicts in Global Society 3**

Exploration of the utilization of space and spatial harmony and conflict on a personal, local, national, and global basis through readings, up-to-date news coverage, and recent films. Includes a spectrum of critical issues.

**405 Problems of World Hunger: An Integrated Approach 3**

Exploration of multiple dimensions of hunger from a variety of academic and international perspectives:

geographic, political, economic, agricultural, nutritional/health, and social/cultural.

**489 Capstone Experience 1**

The Capstone Experience for a Bachelor of University Studies degree consists of a reflective paper designed to provide the student with the opportunity to integrate, synthesize and apply the cumulative academic experience. Course includes resume preparation, interview skills, and a brief oral presentation. Pass/Fail grading only.

**VETERINARY SCIENCE (VETS)**

Odde, Chair; Barigye, Berryhill, Colville

**COURSES****115 Medical Terminology for the Paraprofessional 1**

Medical terminology explored through a systematic study of word parts and the combinations used to build medical terms.

**125 Animal Restraint 2**

Study of behavioral characteristics and handling techniques of farm, companion, and laboratory animals.

**130 Companion Animal Breeds 1**

History, development, uses, characteristics, and genetic predispositions of dogs, cats, horses, goats, birds, and laboratory animals. General terms associated with each species, and pertinent color patterns.

**135 Anatomy and Physiology of Domestic Animals 3**

Introduction to the anatomy and physiology of common domestic mammals. Emphasis on how the body's normal structures and functions contribute to health.

**136 Anatomy and Physiology Laboratory 1**

To accompany VETS 135.

**150 Introduction to the Veterinary Profession 1**

Exploration of the many educational and career opportunities in veterinary medicine available to both veterinarians and veterinary technicians.

*(The following courses are restricted to Veterinary Technology majors only.)*

**255 Fundamentals of Veterinary Radiography 3**

Diagnostic radiograph production including X-ray machine operation, dark room procedures, radiographic positioning, and radiation safety.

**256 Veterinary Clinical Techniques & Instruments 4**

Clinical procedures and instrumentation used in the day-to-day operation of a veterinary practice.

**259 Small Animal Diseases 2**

Basic principles of common dog and cat diseases with emphasis on client education.

**357 Veterinary Pharmacology 3**

Study of drugs used in veterinary medicine with particular emphasis on commonly used drug groups.

**358 Veterinary Surgical Nursing Techniques 4**

Preparation for and assistance with veterinary surgical procedures. Provision of proper aftercare for veterinary surgical patients.

**359 Veterinary Hospital Information & Procedures 2**

Principles of veterinary hospital management and client relations/education.



- 385 Veterinary Clinical Pathology I** 3  
Study of hematology principles and procedures commonly utilized in veterinary medicine.
- 386 Veterinary Clinical Pathology II** 3  
Study of urine analysis and serum chemistry principles and procedures commonly utilized in veterinary medicine.
- 387 Veterinary Clinical Pathology III** 3  
Study of parasitology principles and procedures commonly utilized in veterinary medicine.
- 440 Zoonoses** 3  
Characteristics of diseases transmissible between animals and humans. Prereq: MICR 202 or 350.
- 481 Ward Care/Clinic Care** 1  
Supervised experience managing the care and feeding of Veterinary Technology Program animals and clinical veterinary facilities. May be repeated 4 times.
- 482 Large Animal Techniques** 3  
Handling, restraint, nursing, and management techniques used in large animal veterinary practice. Primarily focused on cattle and horses. Prereq: VETS 256.
- 483 Clinical Veterinary Practicum** 1-3  
Supervised experience applying veterinary diagnostic and therapeutic techniques and procedures in a clinical setting. May be repeated with instructor approval.
- 485 Veterinary Technology Externship** 6-12  
Capstone experience for veterinary technology students. Continued development of skills through supervised work in a veterinary practice or other appropriate clinical setting. Refer to Animal and Range Sciences for information regarding Veterinary Technology program.

## WOMEN'S STUDIES (WS)

### COURSES

- 110 Introduction to Women's Studies** 3  
Exploration of a range of social/domestic and global issues related to women; development of a feminist framework for thinking and writing about woman and gender. (ND:HUM)
- 350 Perspectives in Women's Studies** 3  
Exploration of women and gender from many perspectives. Course provides an opportunity to increase knowledge of the scholarship and writings in Women's Studies, including authors such as Friedan, Baumgardner and Richards, Wolf, and Roiphe. Recommended: WS 110.
- 489 Internship/Capstone** 3  
Integrate coursework taken in Women's Studies major; apply knowledge to women's events and experiences; explore career and graduate options in the field of Women's Studies.

## ZOOLOGY (ZOO)

(See Biological Sciences.)



## State Board of Higher Education

Created by constitutional amendment in 1939, the State Board of Higher Education is the governing body of North Dakota State University and all other state supported institutions of higher education in North Dakota. The board's chief executive officer is the chancellor of the North Dakota University System, with offices in the state capitol in Bismarck.

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Patricia Olson <i>Grand Forks, N.D.</i>	term expires <i>June 30, 2006</i>
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*Ph.D., 1982, Colorado State University*
- McDonald, Clarence E., Emeritus Professor of Cereal Science  
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- McDonald, Hugh J., Emeritus Professor of Agribusiness and Applied Economics  
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- McDonald, Ian C., Adjunct Professor of Entomology, USDA  
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- McEvoy, John, Assistant Professor of Veterinary and Microbiological Sciences  
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- McMullen, Marcia P., Professor of Plant Pathology  
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- Merrill, Stephen D., Adjunct Professor of Soil Science  
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- Messersmith, Calvin G., Professor of Plant Sciences  
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- Meyer, Dwain W., Professor of Plant Sciences  
*Ph.D., 1970, Iowa State University*
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- Miller, James D., Emeritus Adjunct Professor of Plant Pathology, USDA  
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- Moore, Bert L., Associate Professor of Animal and Range Sciences  
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*Ph.D., 2004, Kansas State University*
- Nalewaja, John D., Emeritus Professor of Plant Sciences  
*Ph.D., 1962, University of Minnesota*
- Neate, Stephen M., Associate Professor of Plant Pathology  
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- Nelson, Berlin D., Jr., Professor of Plant Pathology  
*Ph.D., 1979, Washington State University*
- Nelson, Donald C., Emeritus Professor of Plant Sciences  
*Ph.D., 1961, University of Minnesota*
- Nelson, William C., Emeritus Professor of Agribusiness and Applied Economics  
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- Nganje, William, Associate Professor of Agribusiness and Applied Economics  
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- Nichols, Kristine, Adjunct Professor of Soil Science  
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- Nyren, Paul E., Adjunct Professor of Animal and Range Sciences  
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- Ortiz, Carlos E., Adjunct Professor of Plant Sciences  
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- Ostenson, Thomas K., Emeritus Professor of Agribusiness and Applied Economics  
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- Park, Chung S., Professor of Animal and Range Sciences  
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- Porch, Timothy, Adjunct Professor of Plant Sciences  
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## Agricultural Experiment Station

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Stamm, Michele M., Assistant Animal Scientist, Hettinger Research Extension Center  
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## NDSU Extension Service Administration/State Specialists

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Crawford, Ellen, Specialist, Agriculture Communication  
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Hanson, Michael E., Extension Administration  
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Hauck, Duane D., Extension Administration  
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Sturn, Gerald M., Extension Administration  
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## Area Agents/Area Specialists

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Faulkner, Don C., Associate Professor of Architecture and Landscape Architecture  
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Glower, Jacob, Associate Professor of Electrical and Computer Engineering  
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Green, Roger, Associate Professor of Electrical and Computer Engineering  
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Hofman, Vernon L., Associate Professor of Agricultural and Biosystems Engineering  
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Jenkinson, Harold L., Emeritus Professor of Architecture  
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Jorgenson, James L., Emeritus Professor of Civil Engineering  
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*Ph.D., 1995, University of Iowa*

Karami, Ghodrattollah, Associate Professor of Mechanical Engineering  
*Ph.D., 1984, Imperial College of Science and Technology, University of London*

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*Ph.D., 1996, University of Washington*

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*M.S., 1976, University of California - Berkeley*

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Kucera, Henry L., Emeritus Professor of Agricultural and Biosystems Engineering  
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La Palm, George L., Emeritus Professor of Civil Engineering  
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- Li, Kam, Emeritus Professor of Mechanical Engineering  
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- Lima, Ivan, Assistant Professor of Electrical and Computer Engineering  
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- Lin, Wei, Associate Professor of Civil Engineering  
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- Lindley, James A., Associate Professor of Agricultural and Biosystems Engineering  
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- Longhenry, Robert R., Emeritus Professor of Electrical Engineering  
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- Maher, George G., Specialist of Agricultural and Biosystems Engineering  
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- Mahinfalah Mohammad, Professor of Mechanical Engineering  
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- Maleki, Reza, Associate Professor of Industrial and Manufacturing Engineering  
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- Marinov, Valery, Associate Professor of Industrial and Manufacturing Engineering  
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- Martens, Steve C., Associate Professor of Architecture and Landscape Architecture  
*M.Arch., 1988, University of Minnesota*
- Maurer, Karl G., Emeritus Professor of Mechanical Engineering  
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- Mazaheri, Mort L., Emeritus Professor of Community and Regional Planning  
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- McIntyre, Charles, Associate Professor of Construction Management and Engineering; Department Chair  
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- Mehta, Sudhir I., Professor of Mechanical Engineering  
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- Moilanen, Charles W., Emeritus Professor of Agricultural and Biosystems Engineering  
*M.S., 1963, North Dakota State University*
- Nakhaie Jazar, Gholamreza, Assistant Professor of Mechanical Engineering  
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- Nazari, G. H., Lecturer of Mechanical Engineering  
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- Nelson, Robert M., Professor of Electrical and Computer Engineering  
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- Oberlander, LTC David M., Professor of Military Science; Department Chair  
*M.S., 1998, Northwestern University*
- Opgrande, John D., Adjunct Professor of Electrical and Computer Engineering  
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- Padmanabhan, G., Professor of Civil Engineering  
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- Panigrahi, Suranjan, Professor of Agricultural and Biosystems Engineering  
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- Patterson, Floyd M., Associate Professor of Electrical and Computer Engineering  
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- Peloubet, Francis H., Jr., Lecturer of Civil Engineering  
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- Pestes, Michael N., Emeritus Professor of Mechanical Engineering  
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- Peterson, Donald E., Emeritus Associate Professor of Electrical Engineering  
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- Pfister, Philip C., Emeritus Professor of Mechanical Engineering  
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- Pieri, Robert V., Professor of Mechanical Engineering  
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- Pinkston, Rebecca, Assistant Professor of Architecture and Landscape Architecture  
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- Pratt, George L., Emeritus Professor of Agricultural and Biosystems Engineering  
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- Price, Edward W., Emeritus Professor of Mechanical Engineering  
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- Promersberger, William J., Emeritus Professor of Agricultural and Biosystems Engineering  
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- Pryor, Scott W., Assistant Professor of Agricultural and Biosystems Engineering  
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- Rieder, William G., Emeritus Professor of Mechanical Engineering  
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- Rogers, David A., Professor of Electrical and Computer Engineering  
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- Scherer, Thomas F., Associate Professor of Agricultural and Biosystems Engineering  
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- Schroeder, Mark, Assistant Professor of Electrical and Computer Engineering  
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- Schwarz, Jurgen G., Associate Professor of Cereal Science and Agricultural and Biosystems Engineering  
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- Seelig, Bruce D., Specialist of Agricultural and Biosystems Engineering  
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- Serrin, Thomas W., Emeritus Professor of Industrial and Manufacturing Engineering  
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- Shi, Jing, Assistant Professor of Industrial and Manufacturing Engineering  
*Ph.D., 2004, Purdue University*
- Smith, Donald A., Emeritus Professor of Electrical and Computer Engineering  
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- Smith, Gary R., Professor of Construction Management and Engineering; Dean, College of Engineering and Architecture  
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- Steele, Dean D., Associate Professor of Agricultural and Biosystems Engineering  
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*Ph.D., 1966, Michigan State University*
- Stewart, Earl E., Emeritus Professor of Community and Regional Planning  
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- Stewart, Michael, Lecturer of Mechanical Engineering  
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- Stone, James J.S., Associate Professor of Mechanical Engineering  
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- Suzen, Bora, Assistant Professor of Mechanical Engineering  
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- Tareski, Val G., Associate Professor of Electrical and Computer Engineering  
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- Tolliver, Denver D., Adjunct Professor of Civil Engineering  
*Ph.D., 1989, Virginia Polytechnic Institute and State University*
- Ulven, Chad, Assistant Professor of Mechanical Engineering  
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- Urness, Cindy, Assistant Professor of Architecture and Landscape Architecture  
*M.Arch., 1988, Pratt Institute*
- Varma, Amiy, Associate Professor of Civil Engineering  
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- Wells, David L., Professor of Industrial and Manufacturing Engineering  
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- Wiesenborn, Dennis P., Associate Professor of Agricultural and Biosystems Engineering  
*Ph.D., 1988, Rice University*
- Wiley, Catherine, Assistant Professor of Architecture and Landscape Architecture  
*M.L.A., 1998, University of Pennsylvania*
- Wisner, Stephen, Assistant Professor of Architecture and Landscape Architecture  
*M. Arch., 2004, University of Calgary*  
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- Yadav, Om P., Assistant Professor of Industrial and Manufacturing Engineering  
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- Yazdani, Siamak, Professor of Civil Engineering  
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- You, Chao, Assistant Professor of Electrical and Computer Engineering  
*Ph.D., 2005, Rensselaer Polytechnic Institute*
- Yuvarajan, Subbaraya, Professor of Electrical and Computer Engineering  
*Ph.D., 1981, Indian Institute of Technology, Madras, India*
- Zhong, Weihong, Associate Professor of Mechanical Engineering  
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- Ziejewski, Mariusz, Associate Professor of Mechanical Engineering  
*Ph.D., 1986, North Dakota State University*
- Zimmerman, Robert A., Adjunct Professor of Civil Engineering  
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## College of Human Development and Education

- Aakre, Dean E., Extension Specialist  
*M.Ed., 1998, North Dakota State University*
- Albrecht, Jay M., Instructor of Health, Nutrition and Exercise Sciences  
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- Anderson, Earl A., Emeritus Professor of Education  
*Ed.D., 1962, Washington State University*
- Anderson, Sharon D., Emeritus Professor of Human Development and Education  
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- Ary, Judith M., Senior Lecturer of Health, Nutrition and Exercise Sciences  
*M.H.E., 1989, Idaho State University*
- Bach, Annette S., Emeritus Professor of Extension  
*M.S., 1972, University of Southern California*
- Barney, David C., Assistant Professor of Health, Nutrition and Exercise Sciences and School of Education  
*Ph.D., 2001, Florida State University*

- Barnhart, Thomas C., Professor of Health, Nutrition and Exercise Sciences  
*Ph.D., 1978, University of New Mexico*
- Bastow-Shoop, Holly E., Professor of Apparel, Design, Facility and Hospitality Management; Department Head  
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- Bates, Derald, Assistant Professor of Apparel, Design, Facility and Hospitality Management  
*M.Ed., 1994, University of Idaho*
- Beck, Patricia L., Emeritus Professor of Extension  
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- Berglund, Patricia, Associate Professor of Health, Nutrition and Exercise Sciences; Director, Northern Crops Institute  
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- Borgen, Vernon A., Adjunct Professor of Health, Nutrition and Exercise Sciences  
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- Borr, Mari, Assistant Professor, School of Education  
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- Braaten, Ann W., Assistant Professor of Apparel, Design, Facility and Hospitality Management  
*Ph.D., 2005, University of Minnesota*
- Bratteli, Marlys J., Assistant Professor of Child Development and Family Science  
*Ph.D., 2002, University of North Dakota*
- Brotherson, Sean, Extension Specialist and Associate Professor of Child Development and Family Science  
*Ph.D., 1999, Oregon State University*
- Brunt, Ardith R., Assistant Professor of Health, Nutrition and Exercise Sciences  
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- Burkholder, Vel Rae, Emeritus Professor of Health, Nutrition and Exercise Sciences  
*M.S., 1968, North Dakota State University*
- Carlson, Emili J., Assistant Professor of Apparel, Design, Facility and Hospitality Management  
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- Carlson, Thomas Stone, Associate Professor of Child Development and Family Science  
*Ph.D., 2000, Iowa State University*
- Christensen, Bryan K., Assistant Professor of Health, Nutrition and Exercise Sciences  
*Ph.D., 2000, University of Kansas*
- Courneya, Louis J., Extension Specialist  
*M.S., 1998, University of Minnesota*
- Craw, Michael, Assistant Professor of Health, Nutrition and Exercise Sciences  
*Ed.D., 2005, University of Tasmania*
- Daniels, Lisa M., Assistant Professor, School of Education  
*Ed.D., 2002, Texas A&M University*
- Deal, James, Professor of Child Development and Family Science; Department Head  
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- Deutsch, Michael Joseph, Jr., Instructor of Health, Nutrition and Exercise Sciences  
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- Dittman, Jennette K., Emeritus Professor of Education  
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- Dobry, Alberta M., Emeritus Professor of Education  
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- Duffield, Stacy K., Assistant Professor, School of Education  
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- Duggan, Mary, Head Teacher, Center for Child Development  
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- Edwards, Jane U., Assistant Professor, Extension Specialist in Health, Nutrition and Exercise Sciences  
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- Erhardt, Marvin J., Adjunct Assistant Professor of Education  
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- Fitzgerald, Margaret A., Associate Professor of Child Development and Family Science  
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- Fragodt, Alvin L., Emeritus Professor of Extension  
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- Garden-Robinson, Julie A., Extension Specialist and Associate Professor of Health, Nutrition and Exercise Sciences  
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- Gebeke, Debra, Assistant Director, Family and Consumer Sciences  
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- Gregoire, Beulah F., Emeritus Professor of Health, Nutrition and Exercise Sciences  
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- Gress, Nancy M., Director, Student Services and Advancement  
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- Hadedank, Debra A., Director, Center for Child Development  
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- Hall, Thomas, Assistant Professor, School of Education  
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- Hannon, J. Wade, Associate Professor, School of Education  
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- Hansen, Pamela J., Associate Professor of Health, Nutrition and Exercise Sciences  
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- Hanson, Alan, Lecturer, School of Education  
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- Hauge, Linda, Extension Specialist  
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- Hirani, Aditi K., Assistant Professor of Apparel, Design, Facility and Hospitality Management  
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- Hoheisel, Carol, Assistant Professor, School of Education  
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- Holbrook, Sandra, Adjunct Professor of Education  
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- Holes-Dickson, Barbara A., Family Nutrition Program Specialist  
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- Holm, Edna T., Emeritus Professor of Health, Nutrition and Exercise Sciences  
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- Horejsi, Roman J., Emeritus Professor of Health, Nutrition and Exercise Sciences  
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- Hwang, Joyce Hyunjoo, Assistant Professor of Apparel, Design, Facility and Hospitality Management  
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- Isrow, Denis F., Emeritus Professor of Health, Nutrition and Exercise Sciences  
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- Kerns, Roger D., Emeritus Professor of Health, Nutrition and Exercise Sciences  
*Ed.D., 1970, University of South Dakota*
- Ketterling, Gary, Assistant Professor, School of Education  
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- Lajimodi, Denise, Assistant Professor, School of Education  
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- Light, Harriett E., Professor of Child Development and Family Science  
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- Martin, William O., Professor of Education and Mathematics; Department Head  
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- Martindale, Thomas, Emeritus Professor of Extension  
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- McAllister, Shirley E. Friend, Emeritus Professor of Apparel, Design, Facility and Hospitality Management  
*Ed.D., 1960, University of Arkansas*
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- Miller, Jo Ann, Professor of Music Education  
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- Murphy, Patricia D., Emeritus Professor of Education  
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- Narum, Gary A., Associate Professor Emeritus of Education  
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- Overton, Kimberly A., Lecturer, School of Education  
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- Pavek, F. Leslie, Emeritus Professor of Education  
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- Priebe, Donald W., Emeritus Professor of Education  
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- Ragan, Ann, Lecturer, Apparel, Design, Facility and Hospitality Management  
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- Randall, Brandy A., Assistant Professor of Child Development and Family Science  
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Shaw, Richard, Associate Professor, School of Education

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Stark, Carrie B., Extension Specialist

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Teigland, John J., Emeritus Professor of Education

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Werlinger, Ann, Head Teacher, Center for Child Development

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Williams, Robyne C., Assistant Professor of Apparel, Design, Facility and Hospitality Management

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Woods, William G., Emeritus Professor of Education

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## College of Pharmacy, Nursing, and Allied Sciences

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Brown, Gary L., Adjunct Professor of Allied Sciences

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Carlson, James D., Adjunct Professor of College of Pharmacy, Nursing, and Allied Sciences

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Cashmore, Robert W., Adjunct Professor of Allied Sciences

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Christensen, Thomas P., Adjunct Professor of Pharmacy Practice

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Dexter, R. David, Adjunct Professor of Allied Sciences

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Dohman, Tammie K., Adjunct Clinical Instructor of Pharmacy Practice

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Finken, Gerald E., Lecturer of Pharmacy Practice

*M.S., 1990, Kean College of New Jersey*

Fisher, Amy, Assistant Professor of Nursing

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Forster, Keith A., Adjunct Professor of Pharmacy Practice

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Frenzel, Jeanne, Assistant Professor of Pharmacy Practice

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Gillispie, Mary A., Adjunct Professor of College of Pharmacy

*M.D., 1978, Wayne State School of Medicine*

Glunberg, Steven, Adjunct Professor of Pharmacy

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Golman, David S., Adjunct Professor of Pharmacy Practice

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Gosnell, Blake, Adjunct Professor of Pharmaceutical Sciences

*Ph.D., 1982, University of Arizona*

Greenwald, Beverly, Assistant Professor of Nursing

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Grindahl, Kevin, Adjunct Clinical Instructor of Pharmacy Practice

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*D.Sc., 1990, North Dakota State University*

Guo, Bin, Assistant Professor of Pharmaceutical Sciences

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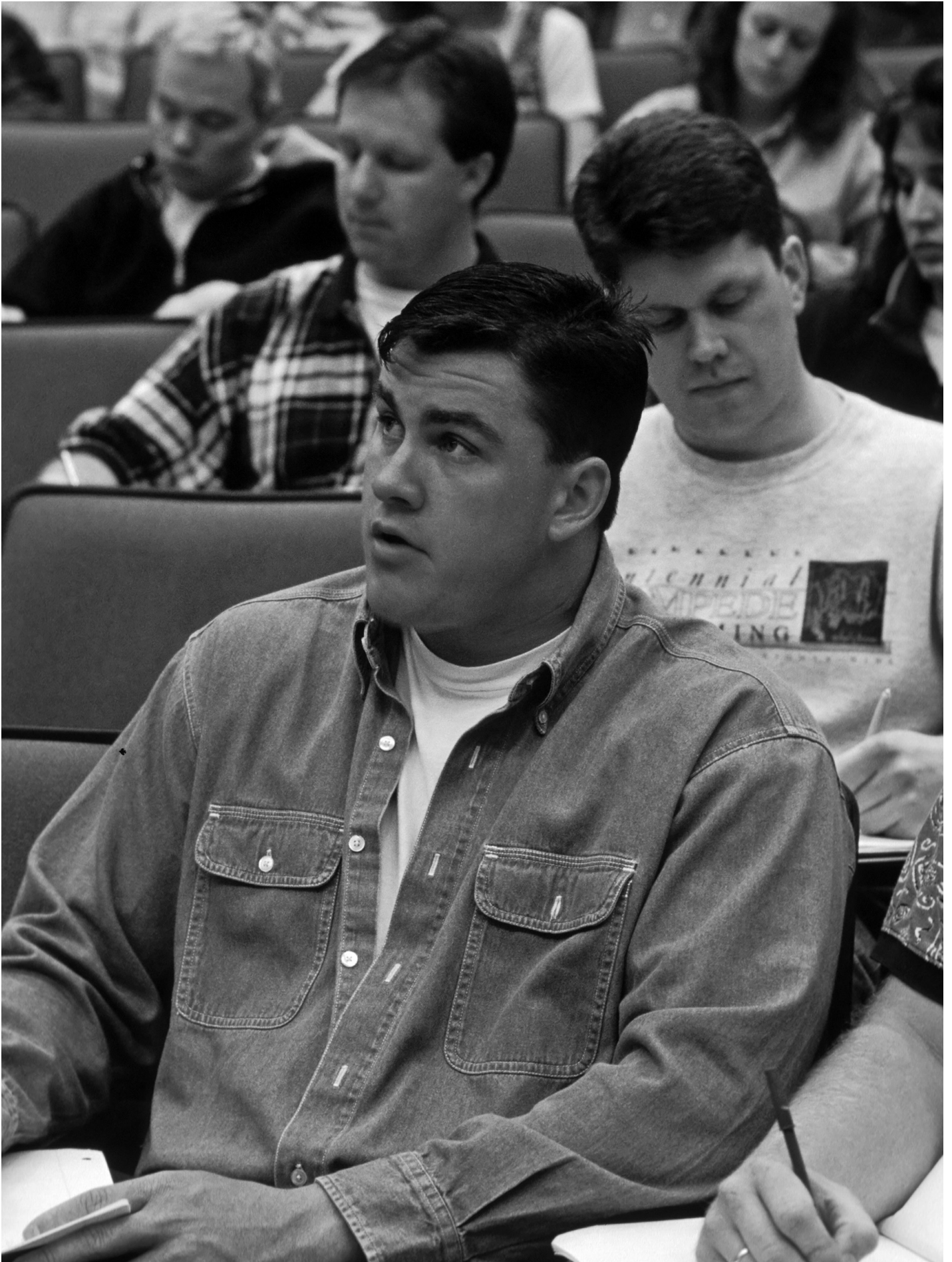
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# Campus Map

## North Dakota State University

<b>S8</b>	<b>1</b> Agricultural and Biosystems Engineering	<b>Q7</b>	<b>34</b> Industrial Agriculture and Communications Center (Computer Network, Computer Science, Industrial Agriculture, Information Technology Services, Upper Great Plains Transportation Institute)	<b>N8</b>	<b>70</b> Sudro Hall (Nursing, Pharmacy)
<b>R11</b>	<b>2</b> Alba Bales House (Family Studies Institute)	<b>Q2</b>	<b>35</b> Johansen Hall (Seed Research, State Seed Dept.)	<b>S4</b>	<b>71</b> Sugar Beet Research
<b>D1</b>	<b>3</b> Alien Technology	<b>R8</b>	<b>36</b> Ladd Hall (Chemistry)	<b>V7</b>	<b>72</b> Thordarson Hall (Independent Study)
<b>S12</b>	<b>4</b> Alumni, Development Center	<b>U9</b>	<b>37</b> Library	<b>R6</b>	<b>73</b> Thorson Maintenance Center (Campus Parking, Facilities Management)
<b>J1</b>	<b>5</b> Animal Nutrition and Physiology Center/ Occupational Safety and Environmental Health	<b>N2</b>	<b>38</b> Living Learning Center	<b>T14</b>	<b>74</b> United Campus Ministry
<b>P9</b>	<b>6</b> Architecture and Landscape Architecture Art (see NDSU Downtown)	<b>O7</b>	<b>39</b> Loftsgard Hall (Biochemistry, Plant Sciences)	<b>P4</b>	<b>75</b> Van Es (Microbiological Sciences, Vet Science)
<b>U7</b>	<b>7</b> Askanase Hall (Little Country Theatre) (Reineke Fine Arts Center)	<b>S5</b>	<b>40</b> Lord and Burnham Greenhouses	<b>O6</b>	<b>76</b> Waldron Laboratory (Agriculture, Soil Testing Lab, Statistics)
<b>U5</b>	<b>8</b> Auxiliary Enterprises (University Police)	<b>R13</b>	<b>41</b> Lutheran Student Center	<b>N7</b>	<b>77</b> Walster Hall (Agriculture)
<b>O11</b>	<b>9</b> Bentson/Bunker Fieldhouse (Athletics, HNES, ROTC)	<b>R5</b>	<b>42</b> Maintenance Buildings	<b>P2</b>	<b>78</b> Wellness Center (YMCA of NDSU)
<b>G7</b>	<b>10</b> Biosciences Research Laboratory	<b>R9</b>	<b>43</b> Memorial Union (Varsity Mart)	<b>L6</b>	<b>79</b> West Dining Center
<b>G11</b>	<b>11</b> Bison Sports Arena (Athletic Media Relations, Athletics, Campus Recreation/ Intramural, HNES)	<b>S10</b>	<b>SU</b> Metered Parking Lot	<b>O6</b>	<b>80</b> Widakas Lab (Com Seed House, Plant Sciences)
<b>B5</b>	<b>12</b> Candlewood Suites	<b>T7</b>	<b>44</b> Minard Hall (Arts, Humanities and Social Sciences)	<b>HOUSING UNITS</b>	
<b>V13</b>	<b>13</b> Center for Technology Enterprises	<b>S7</b>	<b>45</b> Morrill Hall (Ag Communication, Agribusiness and Applied Economics, Agricultural Administration) (Document Publishing Center)	<b>L11</b>	<b>81</b> Bison Court
<b>S11</b>	<b>14</b> Ceres Hall — (Admission, Career Center, Cooperative Education, Counseling Center - Disability Services, Financial Services, International Programs, Multicultural Student Services, Orientation and Student Success, Registration and Records, TRIO Programs)	<b>U6</b>	<b>46</b> Music Education Building (Festival Concert Hall) (Reineke Fine Arts Center) NDSU Downtown, 650 NP Avenue (Architecture and Landscape Architecture, Tri-College, Visual Arts)	<b>U10</b>	<b>82</b> Burgum Hall
<b>O9</b>	<b>15</b> Civil and Industrial Engineering	<b>S10</b>	<b>47</b> C.I. Nelson Building	<b>Q11</b>	<b>83</b> Churchill Hall
<b>O9</b>	<b>16</b> Construction Management	<b>S6</b>	<b>48</b> Northern Crops Institute	<b>S10</b>	<b>84</b> Dinan Hall
<b>V9</b>	<b>17</b> Credit Union (Northland Educators)	<b>R3</b>	<b>49</b> Northern Crops Science Lab (sugar beets, sunflowers)	<b>N2</b>	<b>38</b> Living Learning Center
<b>V5</b>	<b>18</b> Criminal Justice and Public Policy (1616 12th Ave. N.)	<b>T10</b>	<b>50</b> Old Main (Administration, Business Office, Student Affairs, University Relations)	<b>M6</b>	<b>85</b> Pavek Hall
<b>G9</b>	<b>19</b> Dacotah Field	<b>E3</b>	<b>51</b> Phoenix International	<b>L8</b>	<b>86</b> Reed-Johnson Halls
<b>O9</b>	<b>20</b> Dolve Hall (Mechanical Engineering)	<b>S2</b>	<b>52</b> Plant Sciences Greenhouse	<b>L6</b>	<b>87</b> Seim Hall
<b>R8</b>	<b>21</b> Dunbar Laboratories (Chemistry)	<b>T13</b>	<b>53</b> Post Office	<b>L7</b>	<b>88</b> Severson Hall
<b>Q10</b>	<b>22</b> E. Morrow Lebedeff Hall (Human Development and Education)	<b>T4</b>	<b>54</b> Potato Research-Pesticide Storage	<b>N11</b>	<b>89</b> Stockbridge Hall
<b>P10</b>	<b>23</b> Ehly Hall (Architecture and Landscape Architecture)	<b>T12</b>	<b>55</b> President's House	<b>M7</b>	<b>90</b> Thompson Hall
<b>P8</b>	<b>24</b> Electrical and Computer Engineering	<b>U10</b>	<b>56</b> Putnam Hall (Business)	<b>E14</b>	<b>91</b> University Village
<b>P9</b>	<b>25</b> Engineering Center	<b>E4</b>	<b>57</b> Research I	<b>M9</b>	<b>92</b> Weible Halls (North and South)
<b>O9</b>	<b>26</b> Engineering Quonset	<b>D4</b>	<b>58</b> Research II	<b>SELECTED OFFICES</b>	
<b>Q8</b>	<b>27</b> Engineering and Technology Equine Center (3 miles west of campus on 19th Ave. N.)	<b>E3</b>	<b>59</b> Research and Technology Park	<b>S11</b>	<b>14</b> Admission (Ceres Hall)
<b>V13</b>	<b>28</b> Graduate Center	<b>M8</b>	<b>60</b> Residence Dining Center	<b>T10</b>	<b>50</b> Business Office (Old Main)
<b>Q9</b>	<b>29</b> Katherine Kilbourne Burgum Family Life, 4-H Center (Education)	<b>T6</b>	<b>61</b> Residence Life Facility Services	<b>S11</b>	<b>14</b> Career Center (Ceres Hall)
<b>S6</b>	<b>30</b> Harris Hall (Cereal Science)	<b>O4</b>	<b>62</b> Robinson Hall (Veterinary Research)	<b>S11</b>	<b>14</b> Counseling and Disability Services (Ceres Hall)
<b>Q6</b>	<b>31</b> Hastings Hall (Herbarium)	<b>N4</b>	<b>63</b> Service Center, Pilot Plant	<b>L11</b>	<b>81</b> Dining Services (Bison Court)
<b>T7</b>	<b>32</b> Heating Plant	<b>O7</b>	<b>64</b> Shepperd Arena	<b>T10</b>	<b>50</b> Human Resources (Old Main)
<b>R7</b>	<b>33</b> Hultz Hall (Animal and Range Sciences, Entomology)	<b>A11</b>	<b>65</b> Skills and Technology Training Center	<b>R6</b>	<b>73</b> Parking Office (Thorson Maintenance)
		<b>T9</b>	<b>66</b> South Engineering (Physics)	<b>S11</b>	<b>14</b> Registration and Records (Ceres Hall)
		<b>P6</b>	<b>67</b> Stevens Auditorium	<b>L11</b>	<b>81</b> Residence Life (Bison Court)
		<b>P6</b>	<b>68</b> Stevens Hall (Natural Sciences)	<b>T10</b>	<b>50</b> Student Affairs (Old Main)
		<b>V12</b>	<b>69</b> St. Paul's Chapel (Newman Center)	<b>S11</b>	<b>14</b> Student Financial Services (Ceres Hall)
				<b>U5</b>	<b>8</b> Student Loan Services (Auxiliary Enterprises)
				<b>U5</b>	<b>8</b> University Police (Auxiliary Enterprises)
				<b>R9</b>	<b>43</b> Varsity Mart (Memorial Union)