

NORTH DAKOTA STATE UNIVERSITY

2004-2006 undergraduate bulletin



North Dakota State University Bulletin 2004-2006

President's message

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 becoming an institution of choice. NDSU's enrollment stands at about 12,000 students in our undergraduate and graduate programs. We expect our research expenditures to pass \$100 million by 2005. NDSU's new doctoral programs have given us the graduate program mix of a national land-grant university. And we have joined the ranks of NCAA Division I athletics.

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 bulletin — join us as the university moves to the next level. I believe that many more successes await us.

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Joseph A. Chapman President

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University Telephone Numbers

	Area Code 701
Admission	231-8643
Business Office	231-7320
Counseling and Disability Services	231-7671
International Programs	231-7895
Multicultural Student Services	231-1029
Orientation and Student Success	231-8379
Registration and Records	231-7981
Residence Life (Housing)	231-7557
Student Affairs	231-7701
Student Financial Services	231-7533
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.

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."

NDSU 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

At NDSU, student learning is facilitated by faculty and staff guidance. Increased investments in people are critical to attracting and retaining quality faculty and staff, thereby increasing NDSU's educational standards. As part of this increased investment, faculty and staff salaries will be increased to the midrange of professional peers. NDSU can continue its progress toward being at the midpoint of our peer institutions by being creative in funding its salary pools. Sources of new money will be invested in people through graduate and undergraduate enrollment growth and growth in research activities.

Students are Paramount

NDSU will increase student enrollment to 12,000 students, including increasing graduate student enrollment to 15 percent of total student enrollment. While NDSU exists to serve multiple stakeholders, service to students is paramount. This is accomplished by providing a superior learning environment in and out of the classroom.

Leveraging Support

NDSU, as described in the report of The Roundtable for the North Dakota Legislative Council Interim Committee on Higher Education, will take increasing responsibility for securing the financial resources needed to provide service and education for the people of North Dakota. NDSU plans to accomplish this by leveraging its resources through strategic partnerships with North Dakota, national and global businesses.

Programs

NDSU is an investment by the people of North Dakota in individual and collective economic well being and quality of life. For this reason, the university will aggressively engage in statewide collaborative efforts with North Dakota businesses and with member institutions of the North Dakota University System.

NDSU will use emerging technologies to expand capabilities to meet student demand in the university's traditional areas of focus including agriculture, engineering, applied sciences and extension, as well as expansion into new academic areas and professional fields.

NDSU will emphasize increasing the university's international focus to enhance North Dakota's competitiveness in the global economy.

Stature

NDSU should advance to the level of Doctoral and Research University-Extensive in the new Carnegie classification system. To reach the Extensive classification will require the graduation of 50 or more doctorates in at least 15 academic disciplines per year.

NDSU will build public support for its mission and higher education by increasing public awareness of the many services the university provides.

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 in an exciting time of transformation, with a growing number of faculty in the classroom, expanded choices in academic majors, new and better teaching facilities, and improved living arrangements. Through this commitment to students, NDSU is becoming an institution of choice. NDSU is moving forward in all areas because of the energy and dedication of faculty, staff, students, alumni and friends. NDSU's enrollment is at a record level for undergraduate and graduate programs, research funding is expected to pass \$100 million by 2005 and new doctoral programs have given NDSU the graduate program mix of a national land-grant university.

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

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

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

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

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

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

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 98 buildings on nearly 30 square blocks or 258 acres. With an infrastructure of 5.8 miles of streets, 15.5 miles of sidewalks, 53.7 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 Programs

NDSU offers more than 100 undergraduate and graduate programs of study with degrees 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

Extension and Experiment Stations

(www.ag.ndsu.nodak.edu/research.htm and www.ext.nodak.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, motorpool, 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.

4 University Services and Outreach

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. NDSU's Center for High Performance Computing (CHPC) and other groups contract with ITS to administer advanced computing systems used by researchers and graduate students at NDSU and other campuses throughout the state.

Computer Clusters and Classroom Support:

Several hundred on-campus computers are available for student use, as well as 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, dial-up 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.

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 on 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, 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.

Statistical Consulting:

ITS and the Department of Statistics offer consulting services to help students, faculty, and staff with statistical aspects of their research.

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)

The North Dakota State University Libraries are the Main Library and four branch libraries: the Architecture Library, the H.J. Klosterman Chemistry Library, the Haakenson Health Sciences Library, and the Institute for Regional Studies/University Archives. They play an essential role in the educational and research activities of the university.

The collections include more than 400,000 bound volumes, 5,000 print and electronic full text current serials, 10,000 maps, and a wide variety of audiovisual materials. As a Joint 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.

Reference assistance is available 78 hours per week. The Libraries also offer conference rooms, study carrels, 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 for current information regarding hours, or check the library Web site.

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. The NDSU Libraries also offer electronic databases in a wide variety of subject areas.

NDSU is a member of the Tri-College University and shares library resources with Minnesota State University Moorhead and Concordia College. The twice-daily shuttle service that operates among the three academic institutions, the medical libraries, and public libraries in Fargo-Moorhead is supplemented by a daily shuttle to the UND Libraries, making an expanded document delivery service readily available to NDSU library users. 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)

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.

Distance and Continuing Education (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, offcampus, 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 noncredit 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.

Research and Technology Park (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.

Statistical Consulting Center

(www.ndsu.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.

Tri-College University (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.

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 if 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.

At Concordia: TCU students, faculty, and staff can park in Parking Lot MH/C. *At MSUM:* TCU students can park in Lots P and K.TCU faculty and staff may park in Lots P, K, and F.

At 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 5:00 p.m., but there is no overnight parking.

Alumni Association (www.ndsualumni.com)

The NDSUAlumni 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/ir/ctrs+inst.shtml)

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.

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

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.

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 (CATTT):** CATTT was established in October 2000 to increase technology transfer awareness and activities by NDSU students and faculty. CATTT'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 Business and Consumer Research: Research on attitudes, market indicators, buying intentions, and other characteristics of consumers and business firms in North Dakota is provided periodically to chambers of commerce, businesses, and economic development agencies. Established in 1997, the center operates through various grants on a fee-for-service basis.

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 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 & 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, Dobrudscha Germans, Volga Germans, Volhynian 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-theart" 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)

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)

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/equal_opportunity)

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 nonworking 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 of Equal Opportunity, 202 Old Main, 231-7703, or to the Office for Civil Rights, U.S. Department of Education, 10220 N. Executive Hills Blvd., 8th Floor, 07-6010, Kansas City, MO 64153-1367. The complete and current policy may be viewed online.

Anti-Harassment Policy (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 of Equal Opportunity, the university's General Counsel, the Office of Human Resources, 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 Equal Opportunity Office 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)

As part of its commitment to equal opportunity, North Dakota State University prohibits sexual harassment of its employees and students, including studentto-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 of Equal Opportunity, 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)

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 baving 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 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)

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)

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 ww.ndus. 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 offcampus, 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

$(www.ndsu.edu/ndsu/police/ndsu_personal_safety/index.htm)$

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) 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. A completed college preparatory course report form (included in the application) indicating completion of the core curriculum requirements.
- 3. An official final transcript of all high school credits sent by the high school; official transcript(s) of any subsequent postsecondary course work.
- 4. 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.
- 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 will 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, supplemental applications must be requested and submitted by transfer students seeking admission to the following professional programs:

- Accounting, Accountancy, Business Administration, and Management Information Systems: Send requests to College of Business Administration.
- Clinical Laboratory Sciences: Send requests to Department of Biological Sciences. Application deadline varies by clinical site.
- **Coordinated program in dietetics:** Send requests to the Department of Health, Nutrition and Exercise Sciences. Application deadline is February 15.
- Education: Send requests to School of Education. Application deadlines are February 15 and September 25.
- Nursing: Send requests to the College of Pharmacy. Application deadline is June 15.
- **Pharmacy:** Send requests to the College of Pharmacy. Application deadline is January 1.
- **Radiologic Sciences:** Send requests to the Department of Biological Sciences. Deadline varies by clinical site.
- **Respiratory care:** Send requests to the Department of Biological Sciences. Internship application deadline is March 1.
- Veterinary technology: Send requests to the Department of Veterinary and Microbiological Sciences. Application deadline is April 1.

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 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 the intention of transferring NDSU

credits to their home institution should follow the 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)

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 Bulletin 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). Undergraduate students receiving scores between 470-524 (paper test); 140-190 (computer test) and graduate students with scores between 500-524 (paper test); 173-190 (computer 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 writing to the Educational Testing Service (ETS), Princeton, New Jersey, U.S.A. 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, PO 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 within six months prior to attending 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 Supplemental 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, PO Box 5582, Fargo, North Dakota 58105-5582 U.S.A., telephone: 231-7895, fax: 231-1014, e-mail: ndsu.international@ndsu.nodak.edu or visit the Web site.

Admission of Graduate Students

(www.ndsu.edu/gradschool)

For admission requirements to The Graduate School, refer to the special section on The Graduate School or contact The Graduate School at 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. Students who left in good standing 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. Students who left following academic suspension must petition for readmission. Forms may be acquired online at 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. 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, PO Box 5196, Fargo, ND 58105.

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. Contact the Office of Admission or the respective department for further admission criteria for the following programs:

Accountancy Accounting Architecture Athletic Training **Business Administration** Clinical Laboratory Science Computer Engineering Dietetics **Electrical Engineering** Industrial Engineering and Management Interior Design International Studies Landscape Architecture Management Information Systems Manufacturing Engineering Mass Communication Mechanical Engineering Music Nursing Pharmacy Radiologic Sciences Respiratory Care Speech Communication Teacher Education Veterinary Technology

Orientation and Student Success

(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 latenight 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

Tuition and Fees

(www.ndsu.edu/business_office)

Current tuition and required fees are shown in the related table. All fees are subject to change without notice. Payment instructions are printed in the "Registration Schedule" each semester. In addition to the estimates shown, students should also plan for books and personal expenses. Individual habits and needs vary, but about \$3,500 may be anticipated.

Students may contact the Office of Registration and Records to confirm their residence status for tuition. Returning students who have previously filed for tuition reciprocity but have not been enrolled for the preceding year or more need to re-file. In addition to the required fees listed, the following fees are assessed when and as they apply:

Application Fee \$35

The application fee is non-refundable and must accompany the admission application.

Matriculation Fee \$45

The matriculation fee is a non-refundable fee for all new students to provide orientation programs, tutoring, and retention-related activities.

Distance and Continuing Education Tuition and Fees

Tuition and fees for courses offered through the Division of Distance and Continuing Education are always in addition to regular tuition and fees.

Student Fees

The following student fees have been approved by the student body and are mandatory fees charged each term. The maximum charge for 12 or more credit hours is \$375.86.

Activity \$10.00/credit Career Services \$1.08/credit Health/Wellness \$6.67/credit Technology \$5.21/credit Union Bond \$2.25/credit ConnectND \$5.25/credit NDSA \$.03/credit Library \$.83/credit

Other Fees

Additional fees are applied to special services. Most common are the following:

Course Audit

The course audit (not for credit) fee is 50% of the regular credit tuition charge.

Course Challenge

Course challenge fee is 50% of the regular credit tuition charge. The fee is paid after approval of the petition to challenge, but before the special examination is administered.

Diploma Replacement \$24

A replacement service is provided by the Office of Registration and Records for those who have lost or damaged their diploma.

Laboratory/Special Instructional Fees

Unique services and supplies related to special instructional and laboratory courses incur additional fees. Where applicable, these fees are listed in the "Registration Schedule" each term.

Parking Permits

NDSU employees and students are assessed fees to park in university lots. For further information, contact the Campus Police (231-8998).

Photo ID \$15

All students must have an NDSU photo identification card. Replacement of lost cards is also \$15.

Student Housing Deposit (Family): \$100

The family student housing deposit is refundable, less breakage or damage, upon official withdrawal from the university.

Student Housing Deposit (Single): \$50

Residence hall and single student apartment deposits are refundable, less breakage or damage, upon withdrawal from the university.

Special Examinations As required

NDSU serves as a national testing center. Fees vary for different placement and proficiency testing programs. For specific fee information contact the Office of Counseling and Disability Services, 231-7671.

Student Health Service Fees

Payment of student registration fees entitles a student to the basic services of the Student Health Service. Additional fees are charged for medications, certain studies, and additional services according to rates maintained and available at the clinic.

Room and Board Rates

Room rates average \$941 per semester for most double rooms. Meal plan rates for 2004-05 are listed.

Meal Plans for Students

Three meal plans are available with all you can eat at every meal. Meal plan weeks begin with Monday breakfast and conclude with Sunday dinner. Programs entitle you to one meal per meal period.

20 Meal Plan\$1,422.50/per semester15 Meal Plan\$1,247.50/per semester10 Meal Plan\$1,112.50/per semester

Refund of Tuition and Required Fees

Refund calculations for withdrawal or course drops are in accordance with the North Dakota Board of Higher Education policy 830.2.A copy of the university policy is available in the Student Financial Services Office.

Withdrawals

Tuition and fees will be refunded at 100% for students who withdraw from the university on or before the end of the seventh instructional class day of a regular term. Nonregular (variable length) terms will provide for a proportionate refund schedule based on the length of the term. Students who withdraw after the end of the seventh instructional day or proportionate period of a term will have tuition and fee refunds calculated based upon a declining percentage extending through the 60 percent point of the term. Specific dates and refund percentages are published in the "Registration Schedule" each term.

Course Drops

Refunds, where applicable, will be made at 100% for course drops during the first seven instructional class days of a regular term. Nonregular (variable length) terms will provide for a proportionate refund schedule based on the length of the term. After the seventh day or proportionate period of a term, there are no refunds for students who drop a class or classes and continue to be enrolled at the university.

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 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;
- 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 of an employee of any institution of higher education in this state, and a spouse of any other resident for tuition purposes; and
- 6. 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.

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

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.mheso.state.mn.us. Questions may be directed to:

Higher Education Coordinating Board

400 Capitol Square Building

550 Cedar Street

St. Paul, MN 55101-2292

1-800-657-3866

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. Students 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 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

Program Fees

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.) 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

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.

Program	When the fee will be assessed	Amount of fee
Architecture & Landscape Architecture	Full-time students who have been accepted into the second-year design studio	\$657/semester
	Part-time students who have been accepted into the second-year design studio	\$54.74/credit hr
Athletic Training	All who have been accepted into the Athletic Training Program	\$250/semester
Dietetics	Full-time and part-time students who have completed 60 or more total credit hours in the Coordinated Undergraduate Program in Dietetics (CPD)	\$500/semester
Engineering	Full-time students	\$150/semester
	Part-time students	\$12.50/credit hr
Interior Design	Students who have passed their sophomore review	\$250/semester
Nursing	All who have been formally accepted into the professional program after completion of the pre-nursing curriculum	\$300/semester
Pharmacy	All who have been formally accepted into the professional Pharm.D. program	\$1,990.50/semester

Approximate Undergraduate Costs to Attend NDSU, 2004-2005

	ND resident	MN resident	Contiguous states WICHE/WUE/MHEC NDUS Alumni Dependent 1	Other non-residents
Expenditures	per semester/per year	per semester/per year	per semester/per year	per semester/per year
Tuition (12 or more credits per semester) ²	\$1,991/ \$3,981	\$2,238/ \$4,476	\$2,986/ \$5,972	\$5,315/ \$10,629
Student fees 2	\$376/\$752	\$376/\$752	\$376/\$752	\$376/\$752
Room and board 3	\$2,364/ \$4,727	\$2,364/ \$4,727	\$2,364/ \$4,727	\$2,364/ \$4,727
Books and supplies	\$350/\$700	\$350/\$700	\$350/\$700	\$350/\$700
Total semester	\$5,081/	\$5,327/	\$6,076/	\$8,405/
Total year	\$10,160	\$10,654	\$12,151	\$16,808

¹ Contiguous provinces: Manitoba, Saskatchewan. WICHE/WUE States: Alaska, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, South Dakota, Utah, Wyoming. Also Arizona, California, and Washington for students who enter on or after Fall 1998. N.D. MHEC States: Kansas, Michigan, Missouri, Nebraska. University System alumni include legal dependents and spouse.

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

³ Average cost per semester based on double room and 20-meal plan. A student taking the 15-meal plan and staying in a double room would pay \$2,189 average cost per semester and \$4,377 per year.

Financial Aid (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. Official financial aid award notices are mailed to students the first week of 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 to Zero Credits

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 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 Progress for Financial Aid Eligibility," contact the NDSU Office of Student Financial Services.

Employment

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.

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/career_center)

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 area 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 & 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 and Disability Services

(www.ndsu.edu/counseling)

Counseling and Disability Services professionals understand that students have times in their lives when they need assistance with their academic, personal, career, and social issues. These professional counselors and learning specialists help students who have difficulties that range from everyday concerns to those that are more serious in nature.

Appointments to see a counselor may be made in person, Ceres 212, by telephone (231-7671), or by letter. Students with urgent problems may be seen immediately. Counselors also are available to assist in emergencies that occur outside of regular office hours by calling 231-7671.

Counseling and Disability Services is a department within the Division of Student Affairs and is accredited by the International Association of Counseling Services, Inc. Counseling staff members honor the American Counseling Association Code of Ethics. The Center provides a diverse array of services to students. Services include the following:

Personal counseling. Counseling and Disability Services offers a confidential place for students to explore personal concerns. Some examples of student concerns are anxiety and/or depression, academic performance difficulties, interpersonal relations problems, eating disorders, abuse and violence issues, career and academic-major decisions, crisis needs, and self-esteem enhancement. In addition to individual counseling sessions, the staff offers group counseling and support groups.

Academic counseling. Ongoing educational opportunities in learning strategies and personal development issues are provided. Center staff members serve as instructors for self-growth classes in such areas as career planning and study skills.

Career counseling. Career assessment, exploration, and counseling services are available. A career resource library is maintained to provide current information useful for educational and vocational planning. Included within the career library is DISCOVER, a computerized information and assessment system.

Psychiatric services. Psychiatric assessment and medication management are offered on a limited basis. A nominal fee is charged for these services.

Chemical dependency services. Counseling and Disability Services staff provides referral services for individuals with chemical dependency concerns. Counselors assist in coordinating campus educational programming that fosters healthy lifestyles.

Disability services. Staff members work in cooperation with other campus personnel to ensure that students have access to campus programs and facilities. The type of academic support services and accommodations that are available to eligible students with disabilities include, but are not limited to, the following: counseling and assessment, testing accommodations, readers, assistive technology, classroom accommodations, seasonal transportation services, early registration, advocacy, interpreter service, and referral services to campus, community, and state agencies.

Services for nontraditional students. Services are provided to assist students who have been away from school for a period of time. Informal meetings are arranged to offer a supportive environment for the returning adult learner.

Testing. Counseling and Disability Services is an agency for administering numerous standardized educational and professional tests. Tests commonly administered include the American College Test (ACT), College Level Examination Program (CLEP), the Michigan Test of English Language Proficiency, and qualifying exams for program entrance

Faculty and staff development. Counseling and Disability Services personnel foster faculty and staff development through consultation with individuals and departments, campus presentations, and development of educational materials.

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 \$30 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. Twenty dollars in Bison Bucks also has been added to each meal plan account as a starter account for this free, declining balance program. 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)

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 nonappropriated 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)

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 deposit 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 and deposit are 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)

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.

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)

Blue Key (student leadership and service)

Golden Key (student leadership, service, and scholarship)

Lambda Pi Eta

Libra (sophomore scholarship)

Mortar Board (student leadership and service)

National Residence Hall Honorary (Leadership in Residence Halls)

Order of Omega (Greek leadership and service)

Phi Eta Sigma (freshman scholarship)

Phi Kappa Phi (all academic fields)

Phi Sigma (biology)

Phi Upsilon Omicron (family and consumer sciences)

Pi Kappa Delta (forensics)

Pi Tau Sigma (mechanical engineering)

Psi Chi (psychology) Rho Chi (pharmacy)

Rho Lambda (leadership in social sororities)

Tau Beta Pi (engineering)

Tau Sigma Delta (architecture)

Tri-College Hugh O'Brian Leadership Club (public service and leadership)

Athletics (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. Comprised of seven institutions, California Polytechnic State University, University of California-Davis, North Dakota State University, University of Northern Colorado, South Dakota State University, and Southern Utah University.

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 inframural sports program is provided.

Varsity Mart (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)

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 also are 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 Support Programs

Center for Writers (www.ndsu.edu/cfwriters)

The Center for Writers is an across-the curriculum writing support program designed to provide opportunities for students, faculty, and staff to improve the quality of their writing. In addition to offering guidance with writing, services include helping instructors develop writing assignments and integrate writing into their courses.

The center is located in the basement of the main library. Walk-in service is available; appointments may be scheduled with center consultants when you are in any stage of the writing process. Call 231-7927.

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.

International Program Services

(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.

Multicultural Student Services

(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/pharmacy/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) or (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, be 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.

Study Abroad (www.ndsu.edu/International)

Experience abroad can provide an invaluable education for students. Studying, working, or traveling abroad offers many benefits, such as increasing cultural awareness, improving language skills, and developing an indepth knowledge in a particular field from an international perspective. International experience 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 Canada, France, Germany, Mexico, The Netherlands, Norway, Spain, Sweden, United Kingdom, and is developing exchange programs in other countries. For these programs, no overseas tuition is charged. Students pay regular NDSU campus tuition and fees.

NDSU also is a member of the International Student Exchange Program (ISEP). The ISEP organization offers programs in more than 100 sites around the world, including Africa, Asia, Australia, Canada, Europe, and Latin America.

Students also may take advantage of numerous programs offered through The American Institute of Foreign Study (AIFS), AustraLearn, national organizations, consortia, and other universities. Information about programs abroad is available online, in the Office of International Programs, 338 Ceres Hall, by calling 231-7895, or e-mail to ndsu.international@ndsu.nodak.edu.

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 or from the Office of Registration and Records, 110 Ceres.

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 Graduate School for further information.

TRIO Programs (www.ndsu.edu/trio)

Student Support Services, the McNair Scholars Program, Upward Bound, and the 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).

Student Support Services

The Student Support Services 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. Funding for Student Support Services is provided through a \$390,895 grant from the U.S. Department of Education.

McNair Scholars Program

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

Upward Bound

The Upward Bound 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 and/or a potential first generation college student. In the summer, students attend a five-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 visit campus once a month for academic instruction, career and college preparation along with fun, cultural activities. They also receive 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 Department of Education.

Veterans Upward Bound

The Veterans Upward Bound (VUB) is an individualized educational program 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 program provides advising and referral services. Veterans may be eligible to receive educational benefits while attending the program. 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 colloquia and a senior project. Alternatively, scholars may exit the program after 12 hours with a certificate in General Honors.

First-Year

Colloquium 6 English 111, 121 Honors Composition I, II Literature and Ideas: an interdisciplinary investigation of conflicting values

Second-Year

Colloquium

6 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

Colloquium

Fall semester: an interdisciplinary colloquium

6

Spring semester: student/faculty led discussions on texts chosen by the student participants

Fourth-Year

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 Graduate School section of this bulletin. For more complete details, see The Graduate Bulletin online at 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.

Kev:

M Undergraduate major

- Option (area of emphasis, concentration, or specialization within a 0 major)
- Т Teacher certification available
- Available as an undergraduate minor m
- Certificate program с

College of Agriculture, Food Systems, and Natural Resources

M. m Agribusiness

- M, m Agricultural Economics
 - o Agribusiness
 - o Agrifinance
 - o Commodity Marketing
 - o Custom Option o Farm Management
- M, m Agricultural Systems Management
 - o Business
 - o Applied Technology
 - Dealership Management 0
 - 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, m Microbiology
- o Pre-veterinary Medicine
- M Natural Resources Management
 - o Biotic Resources Sciences
 - o Physical/Earth Resources Sciences o Pollution Sciences
 - o Social Sciences
- **M Plant Protection**
 - o Agronomic (Field Crops)
- o Horticulture
- M, m Soil Science
- M Sports and Urban Turfgrass Management
- M Veterinary Technology

College of Arts, Humanities and Social Sciences

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,T, m History o Public History M, m Humanities M, m Mass Communication o Broadcast Journalism o Broadcast Production o General Communication o Print Media o Public Relations M,T, m Music M, m Philosophy and Humanities M, m Political Science o Public Service o Pre-Law m Religious Studies M,T Social Science M, m Sociology o Anthropology M,T, m Spanish m Spanish Studies M,T,m Speech Communication o Organizational Communication o Public Communication o Rhetorics M, m Theatre Arts o Design and Technology o Performance m Web Design Interdisciplinary: m Gerontology m Women's Studies

College of Business Administration

M, m Accountancy (five year) M, m Accounting (four year) m Agribusiness (Corporate Track) M, m Business Administration o Electronic Commerce m Fraud Investigation c Human Resource Management m Logistics Management M, m Management Information Systems c Marketing c Professional Money Management

College of Engineering and Architecture

m Aerospace Studies-Air Force ROTC

- M Agricultural and Biosystems Engineering
 - o Agricultural Systems
 - o Biomaterials and Food Processing
 - o Environmental Systems

M, m Architecture

- 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 Health Care Management

 - o Process and Production Engineering 0 Production Operations and Management
 - o Reliability and Quality Management
 - o Specialized Manufacturing Process
- M, m Landscape Architecture
 - o Design and Communications
 - o Landscape Construction and Technology Natural Resources Management and Land
 - Reclamation
 - o Rural Community Development

- M Manufacturing Engineering o Aircraft Manufacturing o Electronics Manufacturing o Process Engineering o Production and Manufacturing Systems Engineering M Mechanical Engineering o Polymers and Coatings m Military Science—Army ROTC M Natural Resources Management 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, m Facility Management

 - M, m Hospitality and Tourism Management
 - M Human Performance and Fitness
 - m Individual and Family Wellness
 - M, m Interior Design
 - m Nutrition
 - M Recreation Management
 - o Leadership
 - o Therapeutic Recreation

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, m 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) o Non-teaching option
- M,T Physics Education
- M,T, m Social Science Education
- M,T Spanish Education
- M,T Speech Communication Education

Elementary Education through Valley City State University

Interdisciplinary: m Gerontology m Women's Studies

College of Pharmacy

- M Nursing
- M Pharmaceutical Sciences
- M Pharmacy Doctorate (Pharm.D.)
- **College of Science and Mathematics**
 - M, m Behavioral Statistics
 - M, m Biochemistry and Molecular Biology
 - o Biochemical Business
 - o Biochemistry
 - o Bioinformatics
 - o Biophysics
 - o Molecular Biology
 - M,T, m Biological Sciences
 - o Environmental Science

- M, m Biotechnology M, m Botany M,T, m Chemistry o ACS Certified o Biochemistry o Chemistry Education o Coatings and Polymeric Materials o Pre-Professional Chemistry M Clinical Laboratory Science M, m Computer Science m Geography M,T, m Geology M,T, m Mathematics o Pre-Actuarial Science M Natural Resources Management M,T, m Physics o Computational Physics o Optical Science and Engineering M, m Psychology M Radiologic Sciences M Respiratory Care 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

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

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. The required 12-credit core consists of GEOG 161, POLS 220, ANTH 111, 206, or 450, and HIST 101 or 102. Nine credits of electives are required and 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 is 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.

Majors and Degrees Available Major Degree

A Ad

Accountancy B.Acc. Accounting B.A., B.S. Agribusiness B.S. Agricultural and Biosystems Engineering B.S., M.S.,Ph.D. 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 B.Arch. Art B.A., B.S., B.EA. 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.¹, B.S.
Botany B.A., B.S., M.S., Ph.D.
Business Administration B.A., B.S., M.B.A.

С

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 and Guidance M.Ed., M.S. Criminal Justice B.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 Administration M.Ed., M.S., Ed.S. Electrical and Computer Engineering Ph.D. Electrical Engineering B.S., M.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

Facility Management B.A., B.S. 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-H

Genomics M.S., Ph.D. Geology 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-L

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 Studies² B.A., B.S. Landscape Architecture B.L.A.

М

Management Information Systems B.S. Manufacturing Engineering B.S., M.S. Mass Communication B.A., B.S., M.A., M.S. Mathematics B.A., B.S., M.S., Ph.D. Mathematics Education B.A., B.S. Mechanical Engineering B.S., M.S., Ph.D. 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.S. Music Education-Vocal B.S.

N-P

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. Pharmaceutical Sciences B.S., M.S., Ph.D. Pharmacy Pharm.D. Philosophy and 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 Protection B.S. Plant Sciences M.S., Ph.D. Political Science B.A., B.S. Psychology B.A., B.S., M.S., Ph.D.

R-S

Radiologic Sciences B.A., B.S. Recreation Management B.A., B.S. Respiratory Care B.A., B.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 B.A., B.S., M.A., M.S. Specch Communication Education B.A., B.S. Sports and Urban Turfgrass Management B.S. Statistics B.A., B.S., Ph.D. Statistics B.A., B.S., Ph.D.

T-Z

Theatre Arts B.A., B.F.A., B.S. Transportation and Logistics Ph.D. University Studies B.U.S. Veterinary Technology B.S. Zoology B.A., B.S., M.S., Ph.D.

- ¹ B.A. degree with this major only available through the College of Science and Mathematics.
- ² 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.
- 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.

Credits

First-Year Experience Course (F).....1 Required of all entering freshmen and new students who transfer fewer than 24 semester credits to NDSU.

Category 1: Communication (C).....9

COMM 110, Fundamentals of Public Speaking	
or equivalent	(3)
ENGL 110, College Composition I	
or equivalent	(3)
ENGL 120, College Composition II	
or equivalent	(3)

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

CSCI 122 or 125, Programming, e.g., BASIC, COBOL MATH 104, Finite Math or 146 or higher STAT 330, Intro. Statistics or higher

Category 3: Science and Technology (S)...10

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

Category 4: Humanities and Fine Arts (A) . . 6

- No more than three of the six credits may be in fine arts performance.
- Any performance courses must be in addition to those required for the student's major.

Category 5: Social and Behavioral

Category 6: Wellness (W)2 Required is a two-credit course focused on wellness that integrates at least two of the four

wellness that integrates at least two of the four following areas of lifelong wellness: emotional well-being, nutrition, physical activity, and psychological development.

REQUIREMENTS WITH NO ADDITIONAL CREDITS:

Category 7: Cultural Diversity (D)

This requirement may be met by three credits taken as part of the six credits required in the humanities and fine arts or as part of the six credits required in the social and behavioral sciences in a course approved for cultural diversity.

Students also may submit a written petition to substitute study abroad experiences to meet this requirement. Such experiences must be equivalent to the same time commitment as a three-credit NDSU course and include an academic component.

Category 8: Global Perspectives (G)

This requirement may be met by three credits taken in any department as part of the 36-37 credits required for general education approved for global perspectives. Students also may submit a written petition to substitute study abroad experiences to meet this requirement. Such experiences must be equivalent to the same time commitment as a three-credit NDSU course and include an academic component.

Category 9: Computer Usage Integrated in All majors

Category 10: Communication Activities in Upper-Division Major Courses

Category 11: Comprehension of Personal and Professional Ethics Integrated into Majors

Category 12: Capstone Experience in All Majors

Courses Approved for General Education Requirements as of May 2004

Complete and current listings of approved courses may be found in the Registration Schedule published each term and online at www. ndsu.edu/registrar.

<i>First-Year Experience Course (F)</i> Credits	
ABEN/AGRI/HD&E/ME/UNIV 189:	
Skills for Academic Success	1
1. Communication Category (C)	_
COMM 110: Fund of Public Speaking	3
ENGL 110: College Composition I	3
ENGL 111: Honors Composition I	3
ENGL 120: College Composition II	3
ENGL 121: Honors Composition II	3
2. Ouantitative Reasoning Category (R)	
CSCI 122: Beg BASIC/Visual BASIC	3
CSCI 125: Beg COBOL	3
MATH 104: Finite Mathematics	3
MATH 146: Applied Calculus I	4
MATH 165 Calculus I	4
STAT 330: Intro Statistics	3
3. Science & Technology Category (S)	
Natural Science:	
 ARSC/NRM 225: Natural Resources 	
& Agro-ecosystems	3
BIOL 124: Environmental Science	3
BIOL/ZOO 126: Human Biology	3
BIOL 150/150L: Gen Biology I/	
Lab	1
BIOL 151/151L: Gen Biology II/	
Lab	1
BIOL 220/220L: Human Anatomy	
& Physiol I/Lab	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 & You	2
PLSC 210/211: Horticulture Science/Lab 3/	1
PLSC/BIOL/BOT/ZOO 315/315L:	
Genetics Lab	1
Physical Science:	
CHEM 117/117L: Chemical Concepts	
& Appl/Lab	1
CHEM 121/121L: Gen Chemistry I/Lab 3/	1
CHEM 122/122L: Gen Chemistry II/Lab 3/	1

• GEOL 105/105L: Physical Geol/Lab 3/1 GEOL 106/106L: The Earth Through Time/Lab 3/1 GEOL 304: Eastern North Dakota Field PHYS 110/110L: Intro Astronomy/Lab 3/1 PHYS 120/120L: Fund of Physics/Lab 3/1 PHYS 211/211L: College Physics I/Lab. ... 3/1 PHYS 212/212L: College Physics II/Lab . . . 3/1 3. Science & Technology Category (S), Technology: CSCI 114: Microcomputer Packages. 3 or CSCI 116: Bus Use of Computers4 SOIL 217: Intro to Meteorology 4. Humanities & Fine Arts Category (A) Humanities & Fine Arts: ■ ADFH 410: Dress in World Cultures 3 ARCH/LA 171: Environmental Design I 3 ARCH/LA 172: Environmental Design II. 3 ARCH 321: History of Architecture I3 ARCH 322: History of Architecture II......3 ■ ENGL 330: British/American Women Writers. 3 ■ ENGL 340: 19th-Century American Novel ... 3 ■ ENGL 341: 20th-Century American Novel ... 3 ■ ENGL 342: 19th-Century American ENGL 343: 20th-Century American ■ ENGL 345:Themes in American Culture3 ENGR 311: History of Technology in America 3 • GERM 101: First-Year German I 4 ■ HIST 261:American Indian History3 ■ HIST 271: Intro to Latin American History...3 • HIST 381: Australia & New Zealand3 ■ HIST 431:The North American Plains3 ■ HON 386: World Literature: Imaginary LA 322: History of Landscape Architecture . . 4 MUSC 104: Intro to Music Literature MUSC 105: Intro to Music Literature:

	MUSC 108: Roots of American Popular Music 3
	MUSC 201: World Music
	PHIL 101: Intro to Philosophy
	POLS 240: Political Ideologies
	RELS 100: Intro to Religion
•	SPAN 101: First-Year Spanish I
	SPAN 102: First-Year Spanish II 4
-	SPAN 201: Second-Vear Spanish I 3
•	THEA 110: Intro to Theatre Arts
-	THEA 115 World Film
	THEA 115: WORLD FILLI
	THEA 180: Dramatic Literature & Style
	THEA 280: World Theatre
	WS 110: Intro to Women's Studies
	WS 350: Perspectives in Women's Studies 3
Fi	ne Arts Performance:
	ART 124: Three-Dimensional Design3
	ART 130: Drawing I
	MUSC 112: Varsity Band
	MUSC 115: University Chorus 1
	MUSC 303: Concert Band
	MUSC 206: Concert Choir 1
	1HEA 161:Acting 1
-	
5.	Social & Behavioral Sciences Category (B)
	ADFH 486: Dress & Human Behavior3
۲	ECON 201: Prin of Microeconomics3
ullet	ECON 202: Prin of Macroeconomics 3
	AGEC 220:World Ag Development 3
	ANTH 111: Intro to Anthropology
	CDFS 135: Family Science
	CDFS 186: Consumer & Society 3
	CDFS 230: Life Span Development 3
	CDFS /68: Families & Work 3
-	CDFS 475. Children & Families Apress
	CDFS 4/5: Children & Failmes Across
	Cultures
	COMM 112: Understanding Media/
	Social Change
	COMM 114: Human Communication 3
	COMM 212: Interpersonal Communication 3
	COMM 216: Intercultural Communication3
•	ECON 105: Elements of Economics 3
•	ENGR 312: Impact of Technology on Society. 3
	GEOG 151: Human Geography
	GEOG 161 World Regional Geography 3
•	H&CE 3/1: Leadership & Presentation
	Techniques 2
	UNIES 210. Uniman Connality 2
	HNES 210: Human Sexuality
	HNES 212: Psych Aspects of Drug Use
	& Abuse
	POLS 110: Intro to Political Science 3
	POLS 115: American Government
۲	POLS 120:Terrorism
	POLS 215: Probs/Policies in Am Govt3
ullet	POLS 220: International Politics
•	POLS 225: Comparative Politics
•	POLS 442: Global Policy Issues
	PSYC 111: Intro to Psychology
	PSYC 210: Human Sexuality 3
	PSVC 211: Intro to Behavior Modification 3
	PSVC 212: Psych Aspects of Drug Use
	& Abuse 2
	DEVC 21/2 Social Internation
	PSVC 221, Development of the Development of the Construction
	PSYC 221: Psychology in Business & Industry3
	PSYC 250: Developmental Psychology 3
	PSYC 270:Abnormal Psychology 3
	SOC 110: Intro to Sociology
	SOC 202: Minorities & Race Relations 3
	SOC 214: Social Interaction
	SOC 412: Sociology of Sex Roles
	-

6. Wellness Category (W)

CDFS 242: Couples, Marriages, and Families . . . 3

nD&E 220: maiv & ranning weinness	·	•	•	•	• •	4
HNES 111:Wellness						3
HNES 250: Nutrition Science						3
HNES 270: Consumer Issues in Food &						

Nutrition.3HPER 100: Concepts of Fitness & Wellness.2HPER 217: Personal & Community Health3NUTR 240: Prin of Nutrition3

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

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

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.

Technology is the systematic application of scientific knowledge to solve problems.

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:

- 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.
- 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

- 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.
- Departments or colleges may preclude their students from double counting general education courses.
- 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), 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.
- 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 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 category requirement has been met. The total for all general education categories must be at least 36 semester credits.
- 11. A student who has completed a general education program consisting of a minimum of 36 credits at a regionally accredited institution and who transfers to NDSU or who pursues a second degree at NDSU is considered to have completed his or her general education requirements at NDSU.
- 12. 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:

- 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 further degree requirements. Degree candidates must satisfactorily complete one of the degree curricula offered at NDSU. Because curricula are frequently updated, students are responsible for determining curricular expectations according to the following guidelines:

- 1. Intended degrees, majors, and minors must be declared to become official by providing notice to the Office of Registration and Records, 110 Ceres Hall.
- 2. Students may follow any published curricula from the 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 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.
- 4. 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: Backelor of Accountancy (B Acco

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:

- 1. All curriculum requirements are satisfactorily completed.
- 2. 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 program must be approved by the appropriate department chair.
- 3. 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.

Double Major: A double major may be earned by completing the requirements of two majors offered under the same baccalaureate degree. Each major in a double major must include a minimum of 15 credits unique to the major. 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 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 either 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.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.

- 1. 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. Students should be aware that 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.
- **3.** 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. Students should be aware that some academic programs include more specific grade-point requirements for program components or special credentials.
- **4.** Upper-level credit requirements: At least 37 of the credits presented for graduation must be in courses at the 300 and 400 level.
- 5. Residence requirements and transfer credits: Resident credits include credits registered and paid for at NDSU while attending courses offered on campus, in Tri-College, or via network telecommunication sessions. 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. Ordinarily, the last 30 credits must be resident credits.

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. Within these 36 semester credits, minimum requirements include 15 semester credits in courses numbered 300 or above and 15 semester credits in the major field of study.

Students regularly enrolled in the university will not be allowed credit toward graduation for correspondence courses taken simultaneously with resident study on the campus without the approval of the respective college dean and the university registrar.

- **6. Financial obligations:** Satisfy all financial obligations owed to the university.
- 7. Application for degree audit: Students will be sent a Graduation Audit Request postcard from the Office of Registration and Records. Postcards are mailed according to total degree credit requirements. Students should complete and return the card according to the following guidelines.
 - · 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 Students will be sent audits listing the requirements remaining for completion of the degree and program requested.
- 8. Application for degree: All candidates for a baccalaureate degree must indicate their intent to graduate during registration 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.

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 will not be included in the computation. Candidates who entered NDSU as freshmen and who have earned a minimum institutional grade-point average of 3.60 will be graduated "with honor." Candidates with transfer credits must meet the minimum institutional grade-point average of 3.60 for all credits earned at NDSU, as well as a cumulative grade-point average of 3.60 for all attempts of repeated courses will be included in grade-point average calculations for graduating with honor.

Commencement

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

Students who complete graduation requirements during the summer are eligible to participate in either the May or December 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.

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. Diplomas or official transcripts will not 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.

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:

- College-level course work from regionally accredited colleges or universities will be accepted for transfer. Courses accepted in transfer will not replace any grades or credits earned or repeated at NDSU. 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.
- 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.
- 3. The Office of Registration and Records determines the applicability of transfer credit toward NDSU general education requirements according to North Dakota University System guidelines, where applicable.
- 4. 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 will determine whether these transfer electives may satisfy specific curricular requirements. (See also General Education Administrative Policies.)
- 5. NDSU requires that a minimum of 37 credits toward a baccalaureate degree be earned at the junior or senior level. Therefore, while a freshman- or sophomore-level course transferred from an outside institution may satisfy a specific program requirement at NDSU, that course will not be counted toward the 37- credit upper-division degree requirement.
- 6. Transferable courses with D grades will be accepted by the university; however, colleges and departments determine whether or not these courses apply toward their respective majors and programs. The name of transfer institutions and total credits accepted by NDSU will be indicated on the NDSU transcript.
- 7. Total transfer credits are converted to semester credits. Beginning in fall 2004, course work transferred to NDSU from other institutions will be computed in a cumulative GPA. However, it will be used only for purposes of admission to the university and to 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. 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.

Correspondence Courses

College credit is allowed for courses completed in correspondence only when all of the following conditions have been fulfilled in advance:

- 1. Regular admission requirements have been satisfied.
- 2. Course prerequisites have been satisfied.
- 3. Written permission of the dean of the college in which the student is enrolled has been filed with the Office of Registration and Records.

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.

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 <u>minimum score of 50</u> 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.

The following CLEP policies apply at NDSU:

- The Subject Examination should be taken prior to enrollment in the equivalent or more advanced college-level course.
- 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.
- Credit earned through CLEP is not residence credit and may not be used to satisfy residence-credit requirements for graduation.

Freshman College CompositionENGL 110C3English LiteratureENGL 251 & 252A6	
English LiteratureENGL 251 & 252A6	
American Literature ENGL 261 & 262 A 6	
Analyzing & Interpreting Literature ENGL 271 3	
Free Elective 3	
College French Level I FREN 101 A/G 4	
College French Level II	
Score of 62 required FREN 101 and 102 A/G 8	
College German Level I GERM 101 A/G 4	
College German Level II	
Score of 63 required GERM 101 and 102 A/G 8	
College Spanish Level I SPAN 101 A/G 4	
College Spanish Level II	
Score of 66 required SPAN 101 and 102 A/G 8	
Principles of Microeconomics ECON 201 B/G 3	
Principles 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	
History of the United States I:	
Early Colonization to 1877 HIST 103 A 3	
History of the United States II:	
1865 to Present HIST 104 A 3	
American GovernmentPOLS 115B3	
Introductory Psychology PSYC 111 B 3	
Introduction to Educational Psychology Free Elective 3	
Human Growth & DevelopmentPSYC 250B3	
Introductory Sociology SOC 110 B 3	
General Biology BIOL 150/150L S/L 4	
General Chemistry CHEM 121/121L S/L 4	
College Algebra MATH 103 3	
Trigonometry MATH 105 3	
College Algebra-Trigonometry MATH 107 3	
Calculus with Elementary Functions 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	
Information Systems & Computer Applications Free Elective 3	

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 Counseling and Disability Services Office, 212 Ceres, 231-7671. The current fee for each of the Subject Examinations is \$70.

Advanced Placement (AP) 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 <u>minimum score of three</u> 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.

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

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. Students must receive a minimum score of five 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.

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.
- 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.
- 3. Pay the course challenge fee at the Business Office after receiving approval for the challenge.
- 4. Arrange a mutually convenient date and time for the challenge. 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 fall and spring semesters and a summer session. The 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 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 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 for advising and registration are published each semester in the "Registration Schedule." Other sources of information include the annual "NDSU Dates and Deadlines" pocket calendar, and the Office of Registration and Records Web site: www.ndsu. edu/registrar.

Online. Enrolled students may register online. NDSU anticipates its conversion to a new student registration and information system, Campus Connection (ConnectND), in 2005. Campus Connection will replace ALFI (Access Line For Information) for most student registration transactions and related information. When operational for NDSU, Campus Connection may be accessed online at www.ndsu.edu. Students should continue to utilize ALFI until redirected to Campus Connection. While some procedures and terminology may change as a result of this conversion, students are expected to adhere to current NDSU deadlines and policies. Some features, such as registration, are only available at certain times. Registration instructions are published in the "Registration Schedule" each term.

On-site. On-site registration is provided for students who are unable to or choose not to register online. Refer to the appropriate "Registration Schedule" for information on locations and dates. 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 each semester. Registration for summer session should be completed during the previous spring at the same time as registration for fall semester. The advising period begins one week prior to registration. Copies of the "Registration Schedule" are available online and in the Office of Registration and Records a few days before advising week begins. Students must see their advisor before they register. Those who do not may have an advisor hold placed on their records thereby preventing registration.

Returning students: Retuning students are assigned registration times according to total credits earned after the Reactivation Form is received and processed.

New students: Detailed information regarding orientation and registration options is sent to new students from the Office of Orientation and Student Success.

Changes in Registration

Students who register online may process their schedule changes online through the seventh business day of the semester (the time is reduced proportionately during the summer semester.) Refer to the "Registration Schedule" each semester for specific dates and procedures. As of the eighth business day of the semester, schedule changes are processed by a "Request for Change of Registration" form. Students must acquire the necessary signatures and submit the form along with any required permits to the Office of Registration and Records, 110 Ceres. Forms also are available in departmental offices of advisors.

Adding Courses/Sections

Students may add courses to their schedules during the first 15 days from the start date of the semester. (For the summer session the time is reduced proportionately. Consult the Summer Registration Schedule for specific times related to the various offerings.) 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 course from their schedule without it appearing on their academic record. Consult the Summer Registration Schedule for summer deadlines.

Record (W) drops. Students may continue to drop courses after the norecord 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. For summer and variable length courses, the time is reduced proportionately. W indicators do not affect a student's grade-point average.

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. Consult the Summer Registration Schedule for summer session dates.

Once the audit registration is processed, the decision cannot be reversed. An audit fee is one-half of the regular tuition rate.

Instructor's Drop Policy

Instructors have the option to drop students who have not attended the first week (and is some cases, the first meeting) of a lecture or laboratory. However, this is an optional procedure for instructors. Students are responsible for all course registration activity and should submit a "Request for Change of Registration" to be assured of being dropped from the course and to avoid receiving a grade of "F" 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 writing PO Box 5196, NDSU, Fargo, ND 58105, faxing 231-8959, or stopping in the Office of Registration and Records, 110 Ceres. A telephone call is not sufficient. **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:

- 1. Read and complete the brochure entitled "Withdrawing to Zero Credits," available in the Business Office, 101 Old Main.
- 2. Consult with an NDSU staff counselor if assistance is needed in addressing academic, personal, financial, or other concerns.
- 3. Withdrawals are processed at the Business Office, 101 Old Main, from 8:15 a.m. to 3:30 p.m. on regular working days. Continuing Education course drops (including Co-op) must be processed in 209 Engineering Technology.
- 4. Students are responsible for any unpaid bills at the time of withdrawal.
- 5. 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.

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.

Classification	Completed Credit
Freshman	fewer than 27
Sophomore	27 - 59
Junior	60 - 89
Senior	90 or more
	1 . 1

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.

Full graduate standing: One who has met all requirements for admission and has been accepted by a department or interdisciplinary program leading to a graduate degree. A student must have full graduate standing to receive a graduate degree.

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. A maximum of 10 credits may be completed while under non-degree status. 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 cocurricular 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.

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, distance and continuing education, and extension 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.

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
Passing	g grades	
Α	Excellent	4.0
В	Good	3.0
С	Average	2.0
D	Passing	1.0
Р	Pass (D or better)	*
S	Satisfactory (C or bett	er) *
WP	Drop Passing	* (discontinued in Fall 2003)
W	Withdrew	*
Nonpa	ssing Grades	Honor Points for Each Credit
F	Failure	0.0
т	Incomplete	*

F	Failure	0.0
Ι	Incomplete	*
U	Unsatisfactory	*
WF	Drop Failing	* (discontinued in fall 2003)

Additional Indicators

AU	Audit	
NR	Not Reported	
Ζ	Repeated Course	

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

Grade-Point Average Calculation

Institutional grade-point average (formerly cumulative GPA) 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. Refer also to pass/fail grading and repeated courses. With the implementation of ConnectND, a cumulative grade-point average, which is reflective of course work completed at both NDSU and at regionally-accredited transferring institutions, also will be computed. It will be calculated by dividing the total number of nonor points earned at both NDSU and transferring institutions by the total number of credit hours in which honor points were recorded.

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 during the first three weeks of the regular semester. Refer to the Summer Registration Schedule for summer session deadlines.
- 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 gradepoint 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 passfail basis.

Grades of Incomplete

Under extraordinary circumstances and at the discretion of the instructor, a student may be assigned a grade of Incomplete (I). The 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.
- 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. Except in courses designated as practicum, internship, individual study, field experience, study abroad, or graduate-level research or investigation, the grade of Incomplete must be removed no later than the end of the seventh week of the next semester enrolled. If alternative arrangements are made between the student and the instructor, there must be a written agreement that the instructor files with the department chair and with the Office of Registration and Records.
- 5. 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.
- 6. 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.
- 7. Grades of Incomplete 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.

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.

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.

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. 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 must appeal to correct the error within one academic year of receipt of the academic record. Appeals must be submitted to the Office of Registration and Records, 110 Ceres.

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.

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 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:

Minimum GPA	Completed Credits
1.75 (freshman)	fewer than 27
1.90 (sophomore)	27-59
2.00 (junior & senio	r) 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 session.

Grade-Point Average (GPA)

Semester GPA refers to the grade-point average for any given grading period (term). Institutional GPA (formerly cumulative GPA) refers to the grade-point average for all grading periods completed at NDSU. Effective with the implementation of ConnectND, cumulative GPA will refer to the composite grade-point average of course work taken at both NDSU and regionally-accredited transferring institutions. Most academic policies and standings have been and will continue to be based on institutional grade-point average.

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 appears on the student's academic record. 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 appears on the student's academic record. 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 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 of more than four weeks in length 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 time 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.

College of Agriculture, Food Systems, and Natural Resources

www.ag.ndsu.nodak.edu/colag/

Morrill Hall 314 (701) 231-7656 Patricia A. Jensen, Vice President and Dean

The college offers academic programs that open doors to exciting opportunities in the expanding realm of agriculture, food systems, and natural resources.Agriculture provided the foundation upon which NDSU was established. Its 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 the people of the region and around the world.

Mission and Values

The college provides challenging academic programs that prepare students to capitalize on 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 and learning and in providing quality programs relevant to agricultural industries and careers.

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 with new technology and a more global perspective.

Food security, biotechnology and genetics, sustainable production systems, bio-energy, and human and animal health are emerging national priorities. Faculty conduct basic and applied research in these and many other areas. Students participate in research and benefit from state-of-the-art equipment in the classroom and in applied learning opportunities in laboratories and in the fields and businesses of partners across the region.

Degree Programs

The college offers tmhe 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
First-Year Experience
Orientation Course
Quantitative Reasoning*
Written & Oral Communications*12
Includes nine general education credits and three cred-
its involving active participation in writing/speaking.
Science & Technology*20
Humanities & Fine Arts*
Social & Behavioral Sciences*
A three-discipline minimum is recommended across 12
credits in the two preceding categories.
Wellness*

* Refer to general education requirements in this bulletin. Specific courses are listed in the centerfold of the course registration schedule for each term.

Candidates for the Bachelor of Science degree must complete a minimum of 128 credits in one of the majors in the college. They must also 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.nodak. edu/colag/ag_desc.html)

The pre-veterinary medicine program does not result in a B.S. degree. Students are urged to select an additional major area of study. (See 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)

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 school opportunities at NDSU see: www.ndsu. edu/gradschool.

Honor System

Students elected to uphold an honor system that 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.nodak.edu/colag/honor.htm)

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 a 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.nodak.edu/ colag/studentorgs.htm)

Field Experience, Internships, Cooperative Education

Students gain practical experience and credits by enrolling in a supervised field experience (internship) offered through individual departments. 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.

Cooperative education and service learning experiences are enrichment activities, but credits may not substitute for academic credits required for graduation by the College of Agriculture, Food Systems, and Natural Resources.

International Study

The college encourages students to gain an international perspective on their studies. Besides study abroad, students may consider adding the international studies major to their major field of study 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)

Department of Agribusiness and Applied Economics

www.ext.nodak.edu/bomepages/aedept/ index.btml

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 applied economics develop a solid foundation in economic science 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: agribusiness, agrifinance, or commodity marketing.

The B.S. degree with a major in Agricultural Economics offers the same options as the Agribusiness major in finance, marketing, or management. 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 problems in food systems. The Agricultural Economics major is ideally suited for students with career objectives in production agriculture.

Besides being important for understanding contemporary social issues, students majoring in economics will find the degree useful in developing career skills for business, law, teaching, public administration, and research. Choice of a custom option in the Agricultural Economics major or involvement in the natural resources management program broadens the options available to students interested in other areas of applied economics. These options allow students to select programs of study consistent with their personal career objectives.

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:

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

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

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

In the agribusiness program:

- Students are exposed to a range of methods useful in agribusiness decision-making. Agribusiness graduates will master problemsolving 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 Curriculum Agribusiness Major

First Year

11131 1001	0	1 CM	113
AGEC 150 or MATH 146, Quant Econ or Calc .	. 2	(or	4)
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
Total		30-	32

Second Year

ACCT 200, 201, Elements of Accounting I, II 6
AGEC 242, Intro to Agricultural Management4
AGEC 244, Agricultural Marketing
AGEC 246, Intro to Agricultural Finance I4
STAT 330, 331, Intro Statistics, & Regression Analysis 5
Agricultural Science Electives
Communication or Foreign Language Elective6
Humanities & Fine Arts:
Cultural Diversity Elective
Total

Third Year

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	
Total	30

Fourth Year

AGEC 445, Agribusiness Industrial Strategy
AGEC 491/496, Internship
Agribusiness Area Courses (incl. capstone)6
Business Minor Electives
Free Electives
Total
Curriculum Total
* Course requirements vary depending upon the pro- gram 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.

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

In addition to finance, marketing, and agribusiness management, students majoring in agricultural economics may select from two additional options:

Production and Farm Management: This option prepares students for both management and technical aspects of farming, ranching, and agribusiness, or for employment in Extension, consulting, or government agencies.

Custom Option: This option includes programs created to meet unique student interests in areas such as extension, community development, prelaw, public relations, journalism, broadcasting, or computer applications.

Recommended Curriculum Agricultural Economics Major

First Year

Cradite

Credits

AGEC 150 or MATH 146, Quantitative
Economics or Applied Calculus 2 (or 4)
AGRI 150, Agriculture Orientation
AGRI 189, Skills for Academic Success
COMM 110, Fund of Public Speaking
ECON 201, Prin of Microeconomics3
ECON 202, Prin of Macroeconomics
ENGL 110, 120, College Composition I, II $\ldots \ldots 6$
Agricultural Science Elective
Natural/Physical Sci Elective with Lab
Wellness
Total

Second Year

ACCT 200, 201, Elements of Accounting I, II6
AGEC 242, Intro to Agri Management
AGEC 244, Agricultural Marketing3
AGEC 246, Intro to Agricultural Finance I4
ECON 341, Intermediate Microeconomics 3
STAT 330, 331, Intro Statistics, Regression Analysis5
Communication Elective
Humanities & Fine Arts:
Cultural Diversity Elective
Total

Third Year

AGEC 339, Quant Methods & Decision Making3
AGEC 342, Farm & Agribusiness Management II3
AGEC 344, Agriculture Price Analysis
AGEC 346, Agricultural Finance II
AGEC 375, Applied Agricultural Law
ECON 343, Intermediate Macroeconomics3
Agricultural Science Electives
Business Elective
Communication Elective
Humanities & Fine Arts Elective
Total

Fourth Year

AGEC 484, Agricultural Policy
Agricultural Economics Capstone
Agricultural Economics Option ¹ 21
Free Electives
Total
<i>Curriculum Total</i>

¹ Course requirements vary depending upon the program option. Further information is available from the Department of Agribusiness and Applied Economics.

Economics Major

Economics is the social science that deals with problems of scarcity. It does so through a systematic and logical framework for analyzing how a society solves such problems as what goods and services to produce, how to organize their production, and for whom goods and services are to be produced. Knowledge of economics is necessary for understanding and dealing with such current 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 social issues, economics is useful 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) macroeconomics, which includes study of the general level of prices, employment, and output; (b) microeconomics, which is the study of relative prices, the consequences of different market forms, and consumer behavior; and (c) international trade and international monetary systems.

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 Curriculum Economics Major

First Year

COMM 110, Fund of Public Speaking
ENGL 110, 120, College Composition I, II6
MATH 146, Applied Calculus I
UNIV 189, Skills for Academic Success1
Science & Technology Electives
Social & Behavioral Sciences Electives
Free Elective
Total

Credits

Second Year

ECON 201, Principles of Microeconomics
ECON 202, Principles of Macroeconomics
STAT 330, 331, Intro Stats, & Regression Analysis 5
Humanities & Fine Arts/Cultural Diversity Electives 6
Minor Electives
Social & Behavioral Sciences Elective
Wellness
Free Elective
$\overline{10}$ Total

Third Year

ECON 341, Intermediate Microeconomics 3
ECON 343, Intermediate Macroeconomics3
Economics Elective
English Elective
Humanities & Fine Arts Electives
Minor Electives
Free Electives
Total
Fourth Year
Economics Electives
Minor Electives
F FI (* 12

Curriculum Te	ota	ıl .	 •	•	 •	•	•	•	 •	•	•	 •	•	•	•	•	•	•	•	1	28
Fotal																					30
Free Electives .																					12

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).

Department of Agricultural and Biosystems Engineering

www.ageng.ndsu.nodak.edu

Agricultural Systems Management Major

The Agricultural Systems Management (ASM) major prepares students for careers involving the delivery, management, and support of technical and business systems for food, agricultural, or closely related industries.

The ASM major blends the study of mechanized systems principles, computer-based technologies, business management, agricultural sciences, and communications. 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/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 also minor in agribusiness, business administration, or another discipline.

Agricultural Systems Management graduates are typically employed in positions that provide a 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. Graduates also are frequently self-employed as owners/operators of commercial farms and businesses, and as crop consultants or production specialists.

Students from other majors may minor in Agricultural Systems Management by working with department faculty to select 16 credits in Agricultural Systems Management.

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 Curriculum Agricultural Systems Management Major

First Year	Credits
AGRI 150, Orientation	1
AGRI 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

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

Third Year

ASM 323, Post Harvest Technology
ASM 373, Tractors & Power Units
ASM 374, Power Units Lab
ASM 378, Machinery Principles & Mgt3
CHEM 121,122, General Chemistry I,II 3,3
STAT 330, Intro Statistics
Agriculture/Biological Science Elective
Communication Elective
Wellness
Electives (Specialization/Minor) ¹ 3,4

Fourth Year

ASM 354, Electricity & Electronic Appl
ASM 454, Site Specific Agriculture
ASM 475, Mgt of Agricultural Systems2
ASM 491, Seminar1
ASM 499, Hydraulic Power Princ & Applications 3
Agriculture/Biological Science Elective
Humanities & Fine Arts Elective
Electives (Specialization/Minor) ¹ 6,3
Free Elective

1 Options/Minors (cboose one)

Curriculum Options

Agribusiness or Business Administration (16)

Students select courses in agricultural economics, business, and related areas to achieve career goals in agribusiness 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 handson 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 Curriculum Agricultural/Industrial Equipment Option¹

First Year at NDSCS	Credits
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	

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

Department of Animal and Range Sciences

www.ag.ndsu.nodak.edu/ars/templates/indexes/programindex.btm

Animal and Range Sciences Major

The Animal and Range Sciences major is designed to prepare students for careers in agriculture and related fields. Course work includes biological principles, scientific relationships, management practices, 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, marketing, 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: 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 a science-oriented degree while meeting the course requirements for veterinary schools.

Minor: Students may minor in animal and range sciences by completing 16 credits. Formal approval by the department is required.

Transfer credits: Transfer courses with grade C or better only will be accepted for courses in the major.

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

Recommended Curriculum Animal and Range Sciences Major

First Year	Credits
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

Second, Third	Prod/	ŀ	Range		
& Fourth Years	Bus.	Sci.	Sci.		
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 .	4	4			
ARSC 470, Applied Nutrition	4	4			
ARSC 482, 484, 486, 488	4	2			
ARSC 491, Seminar	2	2	2		
BOT 314, 372, 380			11		
COMM 110, Fund of Public Spkg.	3	3	3		
ENGL 320, Practical 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	3	3	5		
Biology	3	3	4		
Free Electives	22	24	20		
Electives from AGEC, BUSN	7	7			
Electives from Humanities	6	6	6		
Organic Chemistry/Biochem	4	7	4		
Statistics	3	3	3		
Curriculum Totals	128	128	128		

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 Curriculum Equine Studies Major

All Equine Studies majors must meet the following requirements.
First Year	Credits
AGRI 150, Agriculture Orientation	1
AGRI 189, Skills for Academic Success	1
MATH 103, College Algebra	3
ARSC 114, Intro to Animal Sciences	3
VETS 135, Anatomy & Physiology of	
Domestic Animals	3
ENGL 110, 120 College Composition I & II	6
Humanities/Fine Art Electives	3
ARSC 123, Feed & Feeding	3
CHEM 121, 121L, General Chemistry I, Lab	4
BIOL 126, Human Biology	3
ECON 201, Prin of Microeconomics	3
Total	33

Second Year

COMM 110, Fund of Public Speaking
AGEC 242, Intro to Agri Management
ARSC 260, Intro to Equine Studies
ARSC 260L, Equine Care & Mgmt Practicum1
Humanities and Social Science Elective
ARSC 261, Basic Equitation & Horsemanship 1
Wellness
ARSC Elective
CHEM 260, Elements of Biochemistry4
AGEC 244, Agricultural Marketing3
ARSC 361, Intermediate Horsemanship 1
ARSC Elective
PLSC 110,World Food Crops
T-+-1 25

Third Year

PLSC 315, Genetics
ARSC 323, Fund of Nutrition
Cultural Diversity Elective
STAT 330, Introductory Statistics
MICR 202, 202L, Intro Microbiology, Lab
ARSC 365, Equine Evaluation
ARSC 357, Animal Genetics
ARSC 463, Physiology of Reproduction
ARSC Elective
ARSC 494, Internship
Total

Fourth Year

ARSC 363, Equine Nutrition & Physiology 3
ARSC 491, Seminar
ENGL 320, Practical Writing
ARSC 336, Intro to Range Management
ARSC Elective
ARSC 480, Equine Prod & Industry
MICR 465, Fund of Animal Disease
Free Electives
Total
<i>Curriculum Total</i>

Recommended Curriculum Equine Studies Minor

A minor in equine studies requires satisfactory completion of the following courses:

Second Year	Credits
ARSC 123, Feeds & Feeding	3
ARSC 260, Intro to Equine Studies	2
ARSC 260L, Equine Care & Mgmt Practicum	1
Total	6
Third Year	
ARSC 261 Basic Equitation & Horsemanshin	1

mode 201, basic Equitation & norsemanship
ARSC 361, Intermediate Horsemanship 1
ARSC 365, Equine Evaluation
ARSC 463, Physiology of Reproduction
Total

Fourth Year

ARSC 363, Equine Nutrition & Physiology
ARSC 480, Equine Prod & Industry
Total
Total for Minor

Certificate

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

First Semester

ARSC 123, Feeds & Feeding
ARSC 260, Intro to Equine Studies
ARSC 260L, Equine Care & Mgt Practicum 1
ARSC 261, Basic Equitation & Horsemanship 1
ARSC 363, Equine Nutrition & Physiology 3
Total

Credits

Second Semester

lotal	5
ARSC 480, Equine Production & Industry	3
ARSC 365, Equine Evaluation	2
ARSC 361, Intermediate Horsemanship	1

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 24 students who are selected on a competitive basis.

The American Veterinary Medical Association accredits the veterinary technology program.

Recommended Curriculum Veterinary Technology Major

General Courses	Credits
AGRI 189, Skills for Academic Success	1
ARSC 114, Intro to Animal Sciences	3
ARSC 499, Zoonoses	3
BIOL 150, 150L, General Biology I, Lab or	
BIOL 151, 151L, General Biology II, Lab	3,1
CHEM 117, 117L, Chemistry Concepts, Lab or	
CHEM 121, 121L, General Chemistry I, Lab.	3,1
COMM 110, Fund of Public Speaking	3
CSCI 116, Busn Use or	
CSCI 114, Micro Packages	4-3
ENGL 110, 120, College Composition I, II	3,3
ENGL 320, Practical Writing	3
MATH 104, Finite Math	3
MICR 202, 202L, Intro Micr, Lab	2,1
PLSC 315, 315L, Genetics, Lab	3,1
VETS 130, Companion Animal Breeds	1
MICR 465, Fund of Animal Disease	3
Free Electives	19
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 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	196, Ward/Clinic Care 2 @ 1 credit					. 2
VETS	255, Fund of Vet Radiography					. 3
VETS	256, Vet Clinical Tech. & Instruments					. 4
VETS	259, Small Animal Diseases					. 2

VETS 357, Vet Pharmacology
VETS 358, Vet Surg Nurs Tech
VETS 359, Vet Hosp Info & Proc
VETS 385, Vet Clin Path I
VETS 386, Vet Clin Path II
VETS 387, Vet Clin Path III
VETS 485, Externship
VETS 496, Ward/Clinic Care II @ 1 credit 2
Curriculum Total

Interdisciplinary Program in Biotechnology

www.ag.ndsu.nodak.edu/plantsci

Biotechnology Major

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

First Year	Credits
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	L
Wellness	2
Total	

Second Year

CHEM 341, 341L, Organic Chemistry I/Lab 3,1
CHEM 432, Organic Chemistry II
MICR 350, 350L, Gen Microbiology & Lab 3,1
PHYS 211, 211L, College Physics I & Lab
PHYS 212, 212L, College Physics II & Lab 3,1
PLSC 315, 315L, Genetics & Lab
Computer Science
Social & Behavioral Sciences, Humanities
& Fine Arts Electives
Additional Writing or Speech Course
Total

Third Year

BIOC 460, 461, Foundations of Biochem
& Molecular Biology I, II
COMM 110, Fund of Public Speaking
MICR 470, Basic Immunology
MICR 471, Immunology & Serology Lab2
STAT 330, Intro Statistics
*Biotechnology Elective
Social & Behavioral Sciences, Humanities
& Fine Arts Electives
Biotechnology Seminar

Fourth Year

BIOC 465, Prin of Physical Chem/Biophysics4
BIOC 474, Methods in Recombinant DNA Tech3
BOT 380, Plant Physiology or
ZOO 460, Animal Physiology
MICR 482, Bacterial Genetics & Phage3
Biotechnology Seminar1
*Biotechnology Elective
Senior Research
Senior Thesis1
Social & Behavioral Sciences, Humanities
& Fine Arts Elective
Free Elective
Total
<i>Curriculum Total</i>

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	
(2 courses required):	Credits
BIOC 473, Methods of Biochem Research or	
PSCI 409 - Isotope Tracer Tech	3
BIOC 485, Industrial Biotechnology	3
MICR 445, Animal Cell Culture Techniques	2
PPTH 453, Microscopy	3
PLSC 484, Plant Tissue Culture & Micropropagat	tion2

Biotechnology Minor

A	minor	in	biotec	hnology	ree	quires	sati	sfactor	y
co	mpletio	on c	of 22 ci	edits in	the	follow	ing	course	s:

Required:	Credits
BIOC 460, 461, Foundations 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
BIOC 474, Methods in Recombinant DNA Tech3
BIOC 485, Industrial Biotechnology
MICR 445, Animal Cell Culture Techniques2
PPTH 453, Microscopy
PLSC 484, Plant Tissue Culture & Micropropagation 2

Electives in Specialized Areas (6 credits):

BOT 380, Plant Physiology	É
MICR 470, Basic Immunology	,
MICR 471, Immunology & Serology Lab2	2

MICR 482, Bacterial Genetics & Phage
PPTH 324, Intro to Plant Pathology
ZOO 370, Cell Biology
ZOO 460. Animal Physiology

Department of Cereal and Food Sciences

www.ndsu.nodak.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 are also 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 FoodTechnologists (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 Curriculum Food Science Major

First Year Credits CHEM 121, 121L, General Chemistry I, Lab 3,1 CHEM 122, 122L, General Chemistry II, Lab. 3,1 CFS 210, Intro to Food Sci & Tech2 MATH 146, 147, Applied Calculus I, II or Second Year CHEM 341, 341L, Organic Chemistry I, Lab 3,1 PHYS 211, 211L, College Physics I, Lab 3,1

Third Year

BIOC 460, Biochemistry	. 4
CFS 430, 431, Food Unit Operations, Lab 2	2,1

ENGL 320, Practical Writing	3
MICR 350, 350L, General Microbiol, Lab	. 3,1
STAT 330, Intro Statistics	3
*Electives	15
Total	32
Fourth Year	
CFS 450, Cereal Technology	3
CES 460 461 Food Chemistry Lab	2 1

Curriculum Total	128
Total	.32
Electives ¹	. 15
MICR 453, Food & Dairy Microbiology	3
CFS 464, Food Analysis	3
CFS 470, 471, Food Processing, Lab	3,1
CFS 460, 461, Food Chemistry, Lab	3,1
CFS 450, Cereal Technology	3

¹ 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.

Department of Entomology

www.ndsu.nodak.edu/entomology

Plant Protection Major

Plant protection is the management of insects, weeds, and diseases that affect agronomic and horticultural crops. The major is interdisciplinary, combining plant pathology, entomology, and plant sciences. The major gives students a firm foundation in insect and disease and weed management and other critical agronomic areas such as soil science, crop and weed relationships, plant genetics, and horticulture. The Plant Protection major is designed to prepare professionals who are directly involved with pest management, who consult and advise others in management practices, or who work with businesses that are impacted by pest problems.

Because of the important differences in production systems, students may select an option in either agronomic or horticultural plant protection. This major also allows students to take electives to fill the requirements for entry into a graduate program in plant sciences, entomology, plant pathology or other biological science.

Recommended Curriculum Plant Protection Major

First Year	Credits
AGRI 150, Ag Orientation	1
AGRI 189, Skills for Academic Success	1
ECON 201, Prin of Microeconomics	3
BIOL 150, 150L, General Biology, Lab	3,1
CHEM 121, 121L, General Chemistry I, Lab	3,1
CSCI 114, Microcomputer Packages	3
ENGL 110, 120, College Composition I, II	3,3
MATH 103, College Algebra	3
PLSC 110, World Food Crops or	
PLSC 210, 211, Hort, Lab	3-4
PLSC, Weed Identification	1
Humanities and Fine Arts	3
Total	32-33
Second Year	
BOT 372, Structure & Diversity	4
CHEM 122, 122L, General Chemistry II, Lab	3,1
COMM 110, Fund of Public Speaking	3
MICR 202, 202L, Intro Micro, Lab	2,1
PLSC 291, Sophomore Seminar	1
SOIL 210, Intro to Soil Sci	4
STAT 330, Intro Statistics	3
Field Crops or Hort Specialization	3

 Humanities & Fine Arts.
 3

 Social & Behavioral Sciences
 3

 Wellness
 2

 Total
 33

Third Year

1.577 1.677
AGEC 375, Applied Ag Law
BIOL 364, General Ecology
CHEM 260, Elements of Biochemistry4
ENGL 320, Practical Writing
PLSC 315, 315L, Genetics, Lab
PLSC 323, Principles of Weed Science
PPTH 324, Intro Plant Pathology3
Field Crops or Hort Specialization
Free Electives
Total

Fourth Year

BOT 380, Plant Physiology
PLSC 453,Advanced Weed Science2
PLSC 496, Internship 1-3
PLSC 491, Senior Seminar1
SOIL 322, Soil Fertility
Field Crops or Hort Specialization
Free Electives
Total
<i>Curriculum Total</i>

Curriculum Options

Agronomic: This option is for students interested in pest management in field crop production.

Field Crops Specialization	17 Credits
ENT 350, Gen Entomology	5
PLSC 225, Prin Crop Production	3
PLSC 320, Prin Forage Prod	3
PLSC 455, Cropping Systems	3
PPTH 454, Diseases/Field Crops	3

Horticulture: This option is for students interested in management of urban plant problems and pests associated with fruits, vegetables, landscape plants, and nursery/greenhouse crops.

Horticulture Specialization	19 Credits
ENT 350, Gen Entomology	
PLSC 355, 365, Landsc Plants	
PLSC 360, Hort Food Crops	4
PLSC 486, Eco-Physio/Hort Crop	2
PPTH 455/456 Plant Disease Met	3

Great Plains Institute for Food Safety

www.ndsu.nodak.edu/foodsafety

Food Safety (Safe) Major

Our 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: and Human Development and Education 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. 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 NDSU students' present and future educational needs.

Recommended Curriculum Food Safety Major

First Year

	0. 0
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
MATH 146, Applied Calculus I	4
Wellness	2
Total	35

Second Year

CFS 210 Intro to Food Sci & Tech
CHEM 341, 341L, Organic Chemistry I, Lab 3,1
CHEM 342, Organic Chemistry II
MICR 350, 350L, General Microbiology I, Lab 3,1
MICR 460, 460L, Pathogenic Microbiology, Lab 3,2
SAFE 450, Food Safety for the Food Industry3
SAFE 464, Etiology of Foodborne Illness
SAFE 470, Economic, Epidemiologic &
Regulatory Issues in Food Safety

SAFE 484, Food Safety Practicum
SAFE 485, Crisis Communication
STAT 330, Intro Statistics 3
Total

Third Year

BIOC 460, Found of Biochem/Molecular Biol4
CFS 450, Cereal Technology
MICR 453, Food Microbiology
PHYS 211, 211L, College Physics I, Lab 3,1
SAFE 474, Epidemiology
Writing or Speech Elective
Free Electives
Total 29

Fourth Year

CFS 460, 461, Food Chemistry, Lab	. 3,1
CFS 470, 471, Food Processing, Lab	. 3,1
ECON 201, Microeconomics	3
ECON 202, Macroeconomics	3
SAFE 452, Food Laws & Regulations	3
SAFE 486, Capstone Experience in Food Safety	2
Free Electives	10
Total	29
Cumiculum Total	120

* 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 or with the Office of Registration and Records.

School of Natural Resources www.ag.ndsu.nodak.edu/nrm

Natural Resources

Management Major

The Natural Resources Management major prepares students to fill positions requiring a broad background in natural resources as well as depth in one or two specific areas. The program addresses the biological, engineering, and social and economic aspects of managing natural resources as an integrated system.

The Natural Resources Management major, leading to a B.S. degree, is offered through the Colleges of Agriculture, Food Systems, and Natural Resources; Engineering and Architecture; and Sciences and Mathematics.

Emphasis Areas

Cradite

Natural resources management majors may choose from courses in one of the four emphasis areas.

Biotic Resources Science: This emphasis area deals with basic scientific principles that govern the interrelationship between biotic (e.g., plants, animals, microorganisms) and abiotic factors (e.g., climate, soils) in major ecosystems and the use of these principles for environmentally sound management of natural resources and agroecosystems. Topics of study include grassland ecosystems, wetland ecosystems, land reclamation, agroforestry, wildlife, sustainable agriculture, soil biology, and others.

Physical/Earth Resources Sciences: This emphasis area provides an understanding of the physical and chemical aspects of ecosystems. Topics of study include hydrology, water management and quality, waste management, soil properties, data acquisition, energy resources, and land-use management.

Pollution Science: This emphasis area 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, and the impact of environmental pollution on biotic factors.

Social Sciences: This emphasis area prepares students for management, administrative, regulatory, and policy positions that require a broad understanding of the social, biological, and physical aspects of natural resources management and allocation. This area concentrates on human factors (social, political, economic) in environmental management, while recognizing constraints and opportunities presented by physical and biological factors.

Recommended Curriculum Natural Resources Management Major

First Year	Credits
AGRI 150, Ag Orientation	1
AGRI 189, Skills for Academic Success	1
BIOL 150, 150L, General Biology I/Lab	4
BIOL 151, 151L, General Biology II/Lab	4
CHEM 121, 121L, General Chemistry I/Lab	4
COMM 110, Fund of Public Speaking	3
ECON 201, Prin of Microeconomics	3
ENGL 110, 120, College Composition I, II	6
GEOL 105, Physical Geology ¹	3
MATH 104, Finite Mathematics.	3
NRM 150, Natural Resource Mgt Orient	1
Wellness	2
Total	

 Pollution Science also requires GEOL 105L, one credit lab class.

Emphasis Areas

Second Vear	Biotic Resources	Physical & Earth Resources	Social Sci	Pollution Science
ARSC/NRM 225 Natural Resources & Agro-ecosystems	3	3	3	3
ASM 264 Natural Resource Mont Systems	3	3	3	3
FNGL 215 Writing for Work or		5	5	5
ENGL 320 Practical Writing	3	3	3	3
HIST 333 Environmental History or		5	5	5
POIS 215 Problems & Policies in American Govern	3	3	3	3
MATH 146 147 Applied Calculus I & II		8		-
MATH 165 166 Univ Calculus I & II		-		8
PSVC 111 Intro to Psychology	3	3	3	3
SOIL 210 Intro to Soil Science	4	4	4	4
STAT 330 Intro Statistics	3	3	3	3
Emphasis Area Electives		5	6	5
Science & Technology Electives		2	2	- 2
Totals	32	32	20	32
		32	50	32
Third Vo an				
Imra Year			2	
AGEC 559, Quantitative Methods & Decision Making		-	3	-
AGEC 5/5, Applied Agricultural Law.		5	5	5
ASM 299, Measurements in Natural Resource Mgmt	1	1	1	1
BIOL 364, General Ecology.	3	3	3	3
CHEM 122, General Chemistry II	3			
CHEM 151, 161, Principles of Chemistry II & Lab				4
CHEM 240, Survey of Organic Chemistry or				
CHEM 341, Organic Chemistry	· · · ·	-		3
CHEM 260, Elements of Biochemistry	4	-		
ECON 341, Interm Microeconomics	3	3	3	3
ECON 481, Natural Resource Economics or				
ECON 482, Environmental Economics	3	3	3	3
GEOL 412, Geomorphology or				
SOIL 444, Soil Genesis & Survey		3-4		
SOIL 217, Intro to Meteorology		-		3
SOC 340, 341, Soil Research Methods & Lab	–	-	4	
STAT 331, Regression Analysis	–	-	2	
Emphasis Area Electives	6	9	6	3
Humanities & Fine Arts/Cultural Diversity Electives	6	6	6	6
Totals		31-32	34	32
Found Voor				
ASM 475 Mant of Agricultural Systems on				
SOIL 401 Seminar		2		
SOIL 491, Seminar		2		-
CE 309, Fluid Mechanics.		-		5
CE 3/0, Intro to Environmental Engineering		-		3
GEOG 455, Geographic Information Systems or	2	2	2	2
ARSC 452, Geographic Info Systems in Range Survey		3	3	3
NRM 491, Senior Seminar.	2	2	2	2
PHY8 251, 251L, Univ Physics & Lab		-		6
SOC 422, Development of Social Theory or			-	
ANTH 480, Development of Anthropological Theory		-	3	
Emphasis Area Electives	21	19	18	12
Free Electives	2	3-4	3	
Totals	28	29-30	29	29
Curriculum Total	128	128	128	128

Department of Plant Sciences

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.

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 5 credits approved by the department. A minimum of 8 credits must be taken at NDSU, and at least 6 credits must be at the 300-400 level.

Major

Majors must meet all of the following requirements including courses in supporting disciplines.

Recommended Curriculum Crop and Weed Sciences Major

First	Year	Crea	lits
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/Fungi4

Second, Third, and Fourth Years

written und Grut Communications.
COMM 110, Fund of Public Speaking
ENGL 320, Practical Writing
Social & Behavioral Sciences ¹
Humanities & Fine Arts ¹

Rasic & Applied Sciences

Dirote e inpplien serencesi
BOT 380 or ARSC 323 43
CHEM 122, 122L, Gen Chem II, Lab
CHEM 240 or CHEM 260 3-4
STAT 330, Intro Statistics

Crob & Weed Sciences

Crop & week sciences.									
PLSC 215, Weed Identification									. 1

PLSC 225, Principles/Crop Production
PLSC 315, 315L, Genetics, Lab
PLSC 320, Forage Crops
PLSC 323, Weed Science
PLSC 446, Genetics/Plant Improvement
PLSC 455, Cropping Systems
PLSC 491, Sophomore, Senior Seminars 1,1
PLSC 300-400, Electives

Complementary Agricultural Sciences:

ENT 350, General Entomology
MICR 202, 202L, Intro Microbiol, Lab 2,1
PPTH 324, Intro Plant Path
SOIL 210, Intro Soil Science
Free Electives
<i>Curriculum Total</i>

1 Required: 6 credits of bumanities 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 a business career in crop and weed sciences should consider the Agribusiness minor through the Department of Agribusiness and Applied Economics. Students interested in integrated pest management should follow the Weed Science option or pursue a second major in plant protection.

Students interested in biotechnology may major through crop and weed sciences or complete the biotechnology option.

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, MICR 350, 350L (instead of MICR 202, 202L), plus MATH 105 or 146, and PLSC 431 or 453, and PLSC 484 or BOT 480.

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, 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. AGEC 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. Students pursuing this option should consider a double major in plant protection.

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.

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 are also available. For more complete details, see the Graduate Bulletin online at 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 & 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.

Interdisciplinary Program: A four-year interdisciplinary program (Plant Protection major) is available with a horticultural specialization (see Plant Protection).

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 Curriculum Horticulture Major

First Year Credits
AGRI 150, Ag Orientation
AGRI 189, Skills for Academic Success
BIOL 150, 150L, Gen Biology I, Lab or
BIOL 151, 151L, Gen Biology II, Lab
(BIOL 150L, 151L not required for Landscape
or Urban For-Prk Options)
CHEM 121, 122, 121L, Gen Chem I, II, Lab I3,3,1
ECON 201 or 202, Prin of Micro or Macro
ENGL 110, 120, College Composition I, II 3,3
MATH 103, College Algebra
(not required for Biotech Option)
PLSC 210, 211, Horticulture Science, Lab
Total

Horticulture Options

Second, Third, & Fourth Years

Ha Biot	ort ecb	Horti Sci	Lndscp Design	Prod Busn	Urban For-Prk
Major:			6		
PLSC 177, Floral Design			2		
PLSC 219, Prairie & Comm For					2
PLSC 341, Land & Bidding & Contr			1	-	-
PLSC 355, Woody Land Plants	i i	3	3	3	3
PLSC 360, Hort Food Crops 4		4		4	
PLSC 365, Herb Land Plants			2		2
PLSC 368, Plant Propagation 3	i		3		3
PLSC 375, Turf Management			3	-	3
PLSC 412, Nursery Prod & Mgmt				3	
PLSC 422, Grnhse Prod & Mgmt				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	2
PLSC 491, Hort Seminar 1		1	1	1	1
PLSC Electives		/	3	3	4
Agriculture:					
ENT 350, General Entomology		5	5	5	5
NRM 150, Nat Res Mgmt Orient					1
PLSC 315, Genetics	,	3	3	3	3
PLSC 315L, Genetics Lab 1		1		1	1
PLSC 323, Prin of Weed Science		3	3	3	3
PPTH 324, Intro Plant Pathology 3		3	3	3	3
PPTH 455, Plant Disease Mgt or			-	3	-
PPTH 456, Tree Path			3	3	3
SOIL 210, Intro to Soil Science		4	4	4	4
Basic and Applied Sciences					
BOT 372 Struc/Div/Plants & Fungi 4		4	4	4	4
BOT 380. Plant Physiology		4	_	_	-
BOT 460. Plant Ecology	- -		3	-	3
CHEM 240. Survey of Organic Chem or			-	3	3
CHEM 260. Elements of Biochem		4	_	4	4
CHEM 341, Organic Chemistry I		3			_
CHEM 341L, Organic Chem Lab 1		1			
CHEM 342, Organic Chem II					
CSCI 116, Bus/Computers or	l.	4	4	4	4
CSCI 114, Microcomp Pkgs 3	i i	3	3	3	
MATH 146, Calculus	ĺ	4			
MICR 202, Intro Micro 2	:				
MICR 202L, Intro Micro Lab 1					
PHYS 120, Fund of Physics		3	-	-	-
STAT 330, Intro Statistics 3	,	3	3	3	3
Humanities & Fine Arts/Social					
& Behavioral Sciences: 9	,	9	9	9	9
,		-	<i>,</i>	-	
Written & Oral Communications:		-	-	_	_
COMM 110, Fund Public Speaking 3		3	3	3	3
ENGL 320, Practical Wtg or			2	2	2
ENGL 322, Creative Wtg		3	3	3	3
Related:					
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
Minon in Piotochnolog					
See Hort Biotech Option	1				
	1		-		-
Minor in Landscape Arch:					
(See Landscape Hort Option)			16	-	
General Electives <u>11-</u>	12	11-12	7-8	14-16	8-10
Curriculum Totals	28	128	128	128	128

Horticulture Minor

Required Horticulture Courses	Credits
PLSC 210, 211, Hort Science, Lab	3,1

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.

Recommended 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
CSCI 116, Bus/Computers or
CSCI 114, Micro/Pkgs 4/3
ENT 350, General Entomology5
PHYS 120, Fund Physics
PLSC 219, 355, Pr & Com For, Wdy Land Pla 2,3
PLSC 315, 315L, Genetics, Lab 3,1
SOIL 210, Intro Soil Science
Soc Sci, Hum & Fine Arts Electives
Total

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 is also to be included in the plan of study.

Recommended Curriculum General Agriculture Major

	Credits
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 or 116,	
MATH 103 or 104, PLSC 315, & STAT 330	
Written & Oral Communications	12
Required: COMM 110, ENGL 110, 120, & 220	
or 320	
Social/Behavioral Sciences & Humanities	12
Required: Six credits in Humanities	
Agricultural Science Electives	12

Free Electives	. 26
Other	
AGRI 150, Ag Orientation	1
AGRI 189, Skills for Academic Success	1
Wellness	. 2
Curriculum Total 1	28

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, & Natural Resources.

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 Curriculum Exploratory General Agriculture (Non-Degree Program)

First Year Credits Basic Sciences².....7 Second Year

Agricultural Sciences ¹ 10-12
Basic Sciences ² 10
Computer Science
Social & Behavioral Sciences, &
Humanities & Fine Arts
Speech Communication
Wellness
Free Electives

Agricultural science courses recommended include AGEC 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.

² Basic science courses in biology, botany, chemistry, entomology, microbiology, or zoology are recommended.

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.

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 Curriculum Sports and Urban Turfgrass **Management Major**

Credits

First Year Experience: AGRI/UNIV 189, Skills/Academic Success AGRI 150, Ag Orientation Total
Communication Skills: COMM 110, Fund of Public Speaking. 3 ENGL 110, College Composition I 3 ENGL 120, College Composition II. 3 ENGL 320, Practical Writing 3 Total 12
Humanities/Fine Arts 3 Cultural Diversity 3 Total 6
Quantitative Reasoning: STAT 330, Intro Statistics Total
Social/Bebavior Science/Global Perspectives: ECON 201 or 202, Micro/Macroeconomics PSYC 111, Intro to Psychology Total
Wellness
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, 10rfgrass Sci, Ecol/Mgmt 5 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:
Supporting Courses: ACCT 102, Fund of Accounting
BIOL 151, 151L, Gen Biology II/Lab

biol 150, 150L, Gen biology 1/Lab or
BIOL 151, 151L, Gen Biology II/Lab 3, 1
CHEM 121, 121L, Gen Chemistry I/Lab
CHEM 122, Gen Chemistry II
MATH 103, College Algebra
SOIL 210, Intro to Soil Science
SOIL 322, Soil Fert & Fertilizers
ENT 350 (Hort Section), Gen Entomology5
PPTH 324, Intro Plant Pathology

BUSN 350, Found of Management			. :
BUSN 351, Found of Org Behavior or			
BUSN 360, Found of Marketing			. :

Total	-	
Free Electives		27
Curriculum Total		128

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/index.btml

Soil Science Major

Soil science relates soil, water, and atmospheric phenomena to crops and the environment. Study in this subject area carries students through these resources in relationship to crop needs and environmental quality. This includes the processes operative in the soil-plant-atmosphere continuum and their amenability or management for improving results with crops and soil protection. Study deals with the major areas of soil science, including fertility management, conservation, physics, chemistry, genesis, and classification, as well as the closely interacting field of agricultural meteorology. Students also gain an appreciation for environmental concerns.

All majors in soil science must meet the following requirements:

Recommended Curriculum Soil Science Major

	Ci cuito
First Year F	7 S
AGRI 150, Ag Orientation	-
AGRI 189, Skills for Academic Success 1	
CHEM 121, 121L, Gen Chemistry I, Lab 3,1	1
CHEM 122, 122L, Gen Chemistry II, Lab	3,1
ENGL 110, 120, College Composition I,II3	3
MATH 103, 105, College Algebra, Trig 3	3
PLSC 110, World Food Crops	3
Wellness	2
Free Electives	2
Totals	7 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	-
PHYS 211, 211L, Gen Physics, Lab 3,1	1
SOIL 210, Intro to Soil Science	-
SOIL 217, Intro to Meteorol & Climat	3
SOIL 322, Fertility & Fertilizer	3
Free Electives	4
Totals	5 16

Third Year

BIOL 150, Gen Biology	-
CHEM 240 or 341, Organic Chemistry3	-
COMM 110, Fund of Public Speaking	3
MICR 202, 202L, Intro Microbiol, Lab	2,1
SOIL 321, Mgt & Conservation	-
SOIL 333, 339, Managing Soil Phys Prop, Lab 2,1	
STAT 330, Intro Statistics	3
Free Electives	6
Totals	15

Fourth Year

Curriculum Total	128
Totals	16
Free Electives	10
SOIL 491, Capstone Seminar I, II 1	1
SOIL 480, Soil & Waste Disposal	2
SOIL 455, Soil Chemistry	-
SOIL 444, Soil Genesis & Survey 4	
ENGL 215, Wtg/Work or 320, Pract Wtg	3

Soil Science Minor

A minor in soil science requires a minimum of 16 semester credits.

	re	ea	us
SOIL 210, Intro to Soil Science			. 4
SOIL 444, Soil Genesis/Survey			. 4

Choose three of the following:

SOIL 321, Soil Conservation Management
SOIL 322, Soil Fertility & Fertilizers
SOIL 455, Soil Chemistry
SOIL 465, Soil & Plant Analysis
SOIL 410, Soil & the Environment
SOIL 333, Soil Physical Properties
SOIL 217, Intro to Meteorology/Climatology
SOIL 447, Microclimatology
SOIL 480, Soil & Waste Disposal

Department of Veterinary and Microbiological Sciences

bttp://www.vetmicro.ndsu.nodak.edu/index.html This department offers instruction in veterinary science and microbiology, including the epidemiology and prevention of diseases; courses in virology, bacteriology and immunology; animal disease; parasitology; food safety. The veterinary technology major is offered through the Department of Animal and Range Sciences.

Microbiology Major

Crodits

Microbiology is a fundamental biological science that offers a variety of challenges and opportunities. Microbiologists have made some of the most important scientific discoveries in this century. Since 1910, about 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 show 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 find it advantageous to minor in microbiology

Students majoring in microbiology are well prepared to enter graduate school, veterinary school, medical school and 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 minimum grade of C in major courses are required to remain in the microbiology major.

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.

Recommended Curriculum Microbiology Major

	Credits
First Year	F S
AGRI 189	1 -
BIOL 150, 150 L	4 -
BIOL 151, 151 L	- 4
CHEM 121, 121L	4 -
CHEM 122, 122 L	- 4
СОММ 110	- 3
ENGL 110	3 -
ENGL 120	- 3
MATH 105 or 146	3 -
Wellness	- 2
Total	15 16
0 I.W.	
Second Year	4
BIOL 315, 315 L	- 4
CHEM 341, 341 L	4 -
CHEM 342	- 3
MICR 350, 350 L	4 -
MICK 352	- 3
SIAI 330	5 - 2 2
General elective	5 5
	$\frac{3}{17}$ 10
Iotal	1/ 10
Third Year	
BIOC 460	4 -
BIOC 461	- 4
MICR 460	- 3
MICR 460 L	- 2
MICR 475	- 3
MICR elective	3 -
PHYS 211, 211 L	4 -
PHYS 212, 212 L	- 4
General elective	6 -
Total	17 16
Y	
Fourth Year	2
MICR 445	- 2
MICR 4/0	3 - 2
MICR 4/1	2 -
MICR 482	5 -
MICR 480	- 3
	-5 3-6
Free elective	5 6
General elective	<u> </u>
Total	-17 14-17

Pre-Veterinary Medicine

All veterinary schools stress the importance of high scholastic standing and judge applicants on academic preparation, character, personality, general fitness, and knowledge of the veterinary profession. For entrance, most veterinary medical schools require a college study.

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 properly channeled. Students preparing for application to a veterinary school should consult with a pre-veterinary advisor.

Pre-Veterinary students should enroll in the College of Agriculture, Food Systems, and Natural Resources.

College of Arts, Humanities and Social Sciences

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 vigor, 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 and performances.

Invigorating 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:

Anthropology	Mass Communication
Art	Music
Classical Languages	Philosophy-Humanities
Criminal Justice	Political Science
Emergency Management	Social Science
English	Sociology
French	Spanish
History	Speech Communication
Humanities	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. Majors available for the B.S. with special professional intent are the following:

History - Public History Option

Political Science - Public Service Option

B.F.A. Degree

Bachelor's of Fine Arts in theatre arts and in visual arts 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.

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. An additional 12 credits are required by the College of Arts, Humanities and Social Sciences as follows:

Fine Arts (art, music, theatre arts)
Humanities (classical languages, English,
French, German, humanities, history,
philosophy, religion, Spanish)
Social Science (anthropology, communication,
criminal justice, emergency management,
political science, sociology)
Area outside the student's major
Fotal

Credits

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. 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

Interdisciplinary study involves an integration of more than one perspective on a topic. Programs in two interdisciplinary areas are available: gerontology and women's studies.

Gerontology Minor

This program 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. For further information, refer to the College of Human Development and Education section.

Women's Studies Minor

www.ndsu.nodak.edu/womens_studies

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:

Required Core Courses:	Credits
WS 350, Perspectives in 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
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

Elective courses (additional credits, for a total of 18 credits including any course(s) listed above but not taken for core credit)

Creaus
ART 453, Topics in Art History: Women in Art3
CDFS 230, Life Span Development
CDFS 353, Children, Families, & Public Policy3
CDFS 462, Family Crisis
CDFS 475, Children & Families Across Cultures2
ENGL 335, Multicultural Writers
HIST 259, Women & European Hist 1400-18003
HIST 265, Families in America
PSYC 210, Human Sexuality
PSYC 250, Developmental Psychology3
SOC 202, Minorities & Race Relations
SOC 417, Sociology of the Family
SOC 439, Social Change
UNIV 491, Women's Week of Awareness
494 Independent Study in Appropriate Area 1-3
Total Minimum

At least three credits must be taken in each of the two colleges offering the minor — the College of Arts, Humanities, Social Sciences and the College of Human Development and Education.

At the time of this publication, a major in Women's Studies is pending approval from the State Board of Higher Education. Visit the Web site for more details and updates.

Department of Communication

www.ndsu.edu/communication

Majors and minors in Speech Communication and Mass Communication at both undergraduate and graduate levels are available through the Department of Communication. Students may elect to concentrate their studies in one or more areas within the department.

Pre-communication

Students must complete 21 credits of selected courses with a grade of B or above to become a communication major. The courses are COMM 110, 112 or 114, 200 or 212, 216, ENGL 110 and 120, SOC 110 or POLS 110 or PSYC 111 or CJ 201.

Communication with Honors Program

Qualified students may enroll in COMM 111, 217, 321 and a senior seminar within the major and receive Communication with Honors designation by the department. Departmental monetary awards are presented each spring to top majors in this program.

Mass Communication Major

The program in Mass Communication includes a 36 credit mass communication major and a 21 credit minor. Students with a Mass Communication major are prepared for careers in mass media and communications fields, including public relations, newspaper and magazine journalism, radio and television journalism and production. Students also are prepared for graduate study.

Students choosing to major in Mass Communication will take a 21 credit core consisting of COMM 112*, 200*, 310, 313*, 320*, 411, and 431. Students choose six credits of professional specialization courses focusing on an area of interest, including COMM 242, 345, 362, 370, 425, 445, and 472. Six hours of advanced electives must be selected from the following: COMM 434, 435, 436, 442, 443, and 496. The remaining three credits include one other course designated in ENGL (215, 320, 358, 454), BUSN (350, 360, 461), COMM (214, 216, 308, 312, 315, 483), or SOC (340, 341).

Credits

* Mass Communication majors must earn a grade of B or better in these courses.

Recommended Curriculum Mass Communication Major

	Credits
First Year	F S
COMM 110, Fund of Public Speaking	3 -
COMM 112, Understanding Media	- 3
ENGL 110, 120 College Composition I, II	3 3
UNIV 189, Skills for Academic Success	1 -
Humanities/Fine Arts Gen Ed Requirement	3 3
Quantitative Reasoning Gen Ed Reg	- 3
Science & Technology Gen Ed Req	- 3
Soc & Behav Sciences Gen Ed Reg	3 3
Wellness	2 -
Totals	15 18
Second Year	
COMM 200, Intro to Media Writing	3 -
COMM 310, Advanced Media Writing	- 3
COMM 313, Editorial Processes	- 3
CSCI 146, Business Use of Computers or	
CSCI 147, Microcomputer Packages	3 -
Humanities AHSS College Requirement	- 3
Fine Arts AHSS College Requirement	3 -
Science & Tech Gen Ed Req & Lab	4 -
Soc & Behav Sciences College Req	- 3
AHSS Additional Course (Humanities,	
Social Sciences or Fine Arts)	- 3
Totals	13 15
Third Year	
COMM 320, Communication Analysis	3 -
Mass Communication Professional	
Specialization Courses	3 3
Mass Communication Advanced	
Elective Course (400 level)	3 -
Minor Courses	3 6
Electives	3 6
Totals	15 15
Fourth Year	
COMM 431, Communication Ethics	3 -
COMM 411, Communication Theory	- 3
Mass Communication Advanced Electives	6 -
Minor Courses	6 6
Electives	7
Totals	15 16
Curriculum Total	122

Mass Communication Minor

Students choosing to minor in mass communication will take COMM 112, 200, 310, and 431; six credits of professional specialization courses; and three credits of electives in mass communication, excluding COMM 496.

Internet Web Design Minor

Students choosing to minor in the university's Internet Web Design minor will take a 9 credit core consisting of COMM 260, 261, and 496 Internship/ Capstone Experience. Students choose 12 credits of electives in at least two departments from the following: ANTH 465, ART 185, 285, BUSN 370, COMM 242, 362, 442, 494, ENGL 499, MIS/CSCI 277, 299, 371, MIS 375, CSCI 122, 159, 160, 462. It is recommended that students select electives based on a chosen specialization within the minor, such as Web design, programming or systems administration. Up to six credits may be counted for both a major and the Web design minor.

Speech Communication Major

The undergraduate Speech Communication major consists of 36 credits. The major is designed to provide students with a theoretical basis of knowledge about human communication and to give students an opportunity to gain practical communication experience in organizational communication, human communication, or rhetorical and public communication.

Students choosing to major in Speech Communication will take a 15 credit core consisting of COMM 114*, 212*, 216 or 217, 320* or 321*, and 401 or 411. Students choose 15 credits (three of which must be at the 400 level) focusing on professional area of interest, including: COMM 150, 214, 271, 308, 312, 314, 315, 402, 433, 480, or 483. The remaining six credits must be chosen from any 400 level courses listed above, or including: COMM 435, 450, or 496.

* Speech communication majors must earn a grade of B or bigber in these courses.

Recommended Curriculum Speech Communication Major

	Credits
First Year	F S
COMM 110, Fund of Public Speaking	- 3
COMM 114, Human Communication 3	3 –
ENGL 110, 120, College Composition I. II	3 3
UNIV 189. Skills for Academic Success.	1 -
Humanities/Fine Arts Gen Ed Requirement	
Quantitative Reasoning Gen Ed Ramt	- 3
Science & Technology Gen Ed Ramt	3 _
Social & Behavioral Sci Cen Ed Ramt	2 2
Wellness	, , ,
Totala	<u> </u>
10tais 1	0 14
Second Year	
COMM 212, Interpersonal Communication	3 –
COMM 216. Intercultural Communication	3 –
Speech Comm Prof Emphasis Course	3 -
Humanities/Fine Arts Gen Ed Romt	- 3
Humanities AHSS College Ramt	3
Fine Arts AHSS College Ramt	3
Science & Tech Cen Ed Ramt & Lab	- 5
Science & Technology Can Ed Part	- 4
Minor Courses) –) 2
Tatala	$\frac{5}{5}$
	5 10
Third Year	
COMM 320, Communication Analysis	3 –
Speech Comm Prof Emphasis Course	3 3
Speech Comm Advanced Elective (400 level) -	- 3
Soc & Behavioral Sci AHSS College Ramt	3 -
AHSS Additional Course (Humanities Social	/
Sciences or Fine Arts)	3 _
Minor Courses	3 6
Flectives	3
Totals	- <u> </u>
10tais	5 15
Fourth Year	
COMM 401, Survey of Rhet Theory (capstone)	or
COMM 411, Comm Theory (capstone)	3 -
Speech Comm Prof Emphasis Course	3 3
Speech Comm Adv Elect Course (400 level) .	- 3
Minor courses.	3 6
Electives	5 4
Totals	5 16
Curriculum Total	122
Contraction III 1 Of the contraction of the contrac	122

Speech Communication Minor

Students who seek to minor in speech communication will take COMM 114, 212, 216, plus six credits of professional emphasis courses and six credits of advanced electives, excluding COMM 496.

Speech Communication Education

Students who major in Speech Communication Education are required to apply to the School of Education for admission to the teacher education program. Upon acceptance, the student must take the required education courses, and meet the general education requirements for the School of Education. Students seeking the Speech Communication Education major will take COMM 112, 114, 312, 314, 315, 320 or 321, 401, 451, plus six credits of electives in speech communication. Students choosing the Speech Communication Education minor will take COMM 112, 114, 312, 314, 451, plus three credits of electives in speech communication.

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 communication department.

Department of Criminal Justice and Political Science

www.ndsu.edu/ndsu/cjps

Criminal Justice Major

The criminal justice practitioner deals with the broad areas of law enforcement, courts, and corrections. Professional positions may include police work, juvenile probation or parole work, or counseling and correctional work in institutions, group homes or halfway houses. Within these broad areas the practitioner enjoys exciting professional challenges and opportunities for serving society and helping people.

Alumni work in law enforcement, courts, correctional agencies, probation and parole departments, and do so at the local, state, and federal levels. Types of agencies that have employed our graduates include: police departments, sheriff's departments, planning agencies, group homes, juvenile courts, family courts, probation and parole departments, juvenile and adult correctional institutions, halfway houses, and crime and delinquency prevention programs.

A total of 52-53 credits (depending on course work) 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 Curriculum Criminal Justice Major

The Criminal Justice curriculum is an interdisciplinary program drawing on the social sciences, behavioral sciences, humanities, computer sciences, and managerial sciences.

	Cr	edits
First Year	F	5
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	-
SOC 110, Intro to Sociology	
Humanities & Fine Arts Gen Eds	3
PSYC 111, Intro to Psychology	3
Totals	15
for a second We may	
Second Year	
ACC1 102, Fundamentals of Accounting	
POLS 250, Judicial Process	-
PSYC 211, Benavior Modification	5
PSYC 270,Abnormal Psychology	3
Humanities AHSS College Requirement	3
Fine Arts AHSS College Requirement 3	-
Science & Tech Gen Ed Req & Lab3	4
Minor Elective or Foreign Lang	-
AHSS Additional Course	
(Humanities or Fine Arts)	3
Totals 15	16
Third Year	
Wellness Gen Ed Reg	2
PSYC 212 Psyc Aspects of Drug Use/Abuse or	_
PSYC 380 Clinical Psyc 3	
CI 325 Applied Research Methods 4	
CI 330 Criminal Law & Procedure -	3
STAT 330 Introductory Statistics 3	-
Minor Elective or Foreign Lang 3	6
PSYC 370 Forensic Psychology 3	_
Science & Tech Gen Ed Reg -	3
Totals 16	14
104410	
Fourth Year	
CJ 407, Deviant Behavior	3
CJ 406, Crime & Delinquency3	
CJ 460, Criminalization	
CJ 461, Corrections	3
CJ 489, CJ Capstone Course	1
CJ 496, Field Experience 1-6	-
Minor Electives or Foreign Lang6	1-0
Electives	
Totals 14	16
Curriculum Total	. 122

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). The prerequisite is that the student 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

The Department of Criminal Justice and Political Science, in collaboration with the Department of Accounting and Information Systems, 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.

Criminal Justice Club

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 related topics. This includes the investigation of political behavior, 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 36 credits is 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, behavior, comparative politics, and international relations. Nine credits of electives are also to be selected in consultation with an advisor.

Recommended Curriculum Political Science Major

	Credits
First Year	F S
COMM 110, Fund of Public Speaking	- 3
ENGL 110, 120, College Composition I, II	3 3
POLS 110 115, Intro Am Gov,	3 3
UNIV 189, Skills for Academic Success	1 -
Science & Tech	- 3
Humanities/Fine Arts	3 3
Political Science Elective	3 -
Soc/Behavioral Sciences	3 -
Totals	16 15
Second Year	
Humanities/Fine Arts	3 3
Political Science Electives	3 6
Science & Lab.	- 4
Soc/Behavioral Sciences	3 -
Social Sciences	3 -
Free Electives	3 2
Totals	15 15
Third Year	
Humanities/Fine Arts	- 3
Political Science Upper-Div	3 3
Science/Technology	3 -
Social Sciences/Free Electives	99

17

Fourth Year

Political Science Upper-Div	6
Free Electives	9
Fotals	15
Curriculum Total123-1	24

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 are also 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 (36 hours) that includes a concentration of law related courses, as well as required classes in business law, English, ethics, and communication. Electives in business, communication, criminal justice, and psychology 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 is a special professional track that provides students with the opportunity to concentrate their course work in two applied areas of study. This track enables students to build the skills and experiences needed to succeed in public and private sector employment. There are two emphases: government administration and political management. A 15 credit internship is required for either emphasis. The government administration emphasis is designed for those who aspire to future employment in public, private/public, and non-profit bureaucracies. The political management emphasis is designed for those who aspire to careers in political parties, campaign firms, interest group activity, and political media.

The department also offers internships and cooperative education opportunities. For specifics, contact the department.

Department of English

www.ndsu.edu/ndsu/englisb

The 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.

Freshman English requirements are met by completing ENGL 110 and 120 or 111 and 121.

An alternative two-semester sequence (ENGL 112 and 122) is available to non-native speakers.

Currently there are two major sequences leading to the Bachelor of Arts degree. One is for students in liberal arts. The second is for students preparing for high school teaching. Either major requires completion of two years of one foreign language (or the equivalent of second-year competency), and a minimum of 30 credits in English courses beyond the freshman English sequence must be completed by English teaching majors and 36 credits by English liberal arts majors. 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 (Liberal Arts)

ENGL 251 and 252, or 261 and 262, 271, 275, 358, one English linguistics/ language course (450 or 451 or 452 or 453 or 454), 467, and nine of the remaining 15 elective credits at the 400 course level.

Recommended Curriculum English Major (Liberal Arts)

	Credits
First Year I	7 S
COMM 110, Fund of Public Speaking	3
ENGL 110, 120, College Composition I, II 3	3
MATH 104 or higher OR CSCI 1223	
UNIV 189, Skills for Academic Success 1	
Foreign Language	4
Social/Behavioral Science	3
Elective	3
Totals	í 16
Second Year	
ENGL 261, 262, Survey of Am Lit I, II or	

ENGL 251, 252, Survey of Brit Lit I, II 3	3
ENGL 271, Literary Analysis 3	
Foreign Language	3
Social/Behav Sci & Fine Arts elective 3	3
Humanities & Fine Arts Elective	3
Science & Tech	3
Elective (e.g. career-oriented, minor)	3
Totals	15

Third Year

ENGL 322 or 323, Creative Writing	3
ENGL 358, Intermediate Composition 3	
ENGL 380, Shakespeare	3
Science & Tech (lab)	3
Social/Behav Sci or Fine Arts elective	3
Wellness	2
Cultural Diversity	
Global Perspectives	
Electives (e.g., minor,)	3
Totals	17
Fourth Year	
ENGL 467 Capstone 3	

ENGL 450-454 Linguistics/Lang Course	3
400-Level English Elective	9
Electives (e.g., career-oriented, minor) 12	3
Totals	15
Curriculum Total	122

Teaching Major

ENGL 222, 240, 251 or 252, 261 or 262, 271, 358, 380, 450, 451, and 458.

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.

Liberal Arts

ENGL 251 and 252 or 261 and 262, 271, 358, and nine elective credits.

Writing

ENGL 275 and six from among the following: 320 or 321, 322, 323, 357, 358, 457, 458 and 459. One of these must be at the 400 level. Five of the six must be writing courses.

Division of Fine Arts

www.ndsu.edu/finearts

The Division of FineArts includes the Departments of Music,TheatreArts and VisualArts 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 Art

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 upperclass 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 Curriculum Bachelor of Fine Arts Degree

	Cr	edits
First Year	F	5
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
ENGL 110, 120, College Composition I, II 3	3
UNIV 189, Skills for Academic Success 1	-
Science & Technology/with Lab 3	3/1
Fotals	5 16

Second Year

ART 330, 335, Drawing III, Fig Draw3	3
ART 180, Photography	-
ART 160, Sculpture I	3
ART 170 Printmaking I	-
ART 150, Ceramics I	3
ART 185, Digital Media	-
COMM 110, Fund of Public Speaking 3	-
Quantitative Reasoning	3
Humanities	3
Wellness	-
Totals 17	15

Third Year

ART 120, Painting I	- 3
ART 451, 452, Am Art, Contemporary Art 3	3
ART 491, Seminar in Art	-
Upper Division Studio Elective	6
Humanities or Social/Behav Science3	-
Social/Behavioral Sciences	3
Global Perspective & Cult Diversity6	-
Totals	15
Fourth Year	
ART 489 Baccalaureate Project	3
Art History Elective	-
Studio Emphasis	6

Curriculum Total	125
Totals 15	15
Science & Technology	
Social/Behavioral Science	6
Studio Emphasis	6

Recommended Curriculum Bachelor of Arts/Bachelor of Science Degrees

	С	redits
First Year	F	5
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

APT 150/160 Ceramics Lor Sculpture I 3	5
ART 130/170, Cerannes I or Sculpture I	-
AKI 120/1/0, Painting I or Printinkg I	3
COMM 110, Fund of Public Speaking 3	-
Minor or Foreign Language 3-4	3-4
Social/Behavioral Elective	3
Science/Technology Electives	3
Totals	15-16
Third Year	

ADT 225/220 Et- Dam

AK1 555/550, Fig Draw or Draw III 5	-
ART 452, Contemporary Art3	-
Upper Division Studio Elective	3
Foreign Language or Minor	3
Social/Behavioral Science	3
Humanities Elective	3
Global Perspective & Cultural Diversity 3	3
Totals	1

Fourth Year

	Totals 16	15
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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:

- ART130, Drawing I
- ART 122, Two Dimensional Design
- ART 124, Three Dimensional Design
- 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 academic 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

MUSC 103, Introduction to Music History
MUSC 130, 131, Elem Harmony I, II
MUSC 132, 133, Elem Ear Training I, II
MUSC 230, 231, Adv Harmony I, II
MUSC 232, 233, Adv Ear Training I, II
MUSC 250, Basic Conducting
MUSC 330, Contemporary Harmonic Techniques 2
MUSC 340, 341 Music History I, II
MUSC 411, Form & Analysis
Applied Study (various registration numbers) ¹ 22
Pedagogy (through applied study registration)2
MUSC 380, 480, Recitals 1,1

1 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 Literature2
MUSC 331, Instrumental Arranging2
MUSC 344, Wind Band Literature
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)

Vocal Track

MUSC 150, 350, Vocal Pedagogy I, II
MUSC 174, 175, Pronun for Singers I, II
MUSC 142, Opera Literature2
MUSC 199, Song Literature
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
GERM 101, 102, First-year German I, II

Language requirement may be satisfied by departmental proficiency evaluation.

Piano Track

Additional Pedagogy (through applied study reg) 2	
MUSC 143, Keyboard Literature	
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.

Common Music 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 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 & Literatu	ıre2
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

Credits

MUSC 174, 175, Pronun for Singers I, II
MUSC 332, Choral Arranging
MUSC 350, Vocal Methods & Pedagogy II
MUSC 358, Jazz Methods
Applied Voice
Major Choral Ensemble
Major Instrumental Ensemble
Additional Study in Piano
Total \ldots \ldots \ldots $$

Instrumental Emphasis

MUSC 331, Instrumental Arranging2
MUSC 344, Wind Band Literature
MUSC 354, Woodwind Methods II
MUSC 357, Marching Band Meth/Tech or
MUSC 358, Jazz Methods
Applied Major Instrument7
Major Instrumental Ensemble ¹ 7
Major Choral Ensemble2
Applied Voice/Voice Class 2
Total

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
EDUC 322, Educational Psychology
EDUC 381, Early Experience1
EDUC 389, Native Am/Instr Pract
EDUC 451, Instr Planning & Strategies3
EDUC 481, 482, Clrm Prac/Meth I,II
EDUC 485, Student Teaching Seminar
EDUC 486, Classroom Mgt
EDUC 487, Student Teaching
$\overline{10}$ Total

*K-12 Option

CDFS 230 Life Span Dev or

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 ²	31
Music (vocal or instrumental)	70
Education	31
K-12 Option	7
Curriculum Total13	2-139

- ¹ For the instrumental emphasis, students whose primary instrument is keyboard, four credits of Plano Chamber Music may be substituted for four of the seven Major Instrumental Ensemble credits.
- ² General Education requirements total 37 bours, but MUSC 103 and MUSC 340 listed earlier fulfill six credits of the general education bumanities 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.A. and B.S. Programs	Credits
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 Requi	rements
Music Core Requirements	55
Foreign Language (B.A.) or	
Approved Minor (B.S.)	6 (min.)

Curriculum Total .		122-124 (min.)
College Requiren	nents and other ele	ctives)53
Additional General I	Education (includir	ng AHSS
11		

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	Credits
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	

Music Minor for Education Majors

MUSC 103, Intro Music History
MUSC 130, 131, Elem Harmony I, II
MUSC 132, 133, Elem Ear Training I, II 1,1
MUSC 150, Basic Conducting
Applied Study (2 semesters)
Major Ensemble (2 semesters) and 1,1

Two credits from the following:2
MUSC 150, Vocal Methods & Pedagogy I
MUSC 353, Woodwind Methods I
MUSC 355, Brass Methods I
MUSC 359, Percussion Methods
Total

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

Major Requirements	Credits
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
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
THEA 266, Voice & Movement for the Actor
THEA 271, Costume Construction

THEA 276, Makeup Design II
THEA 372, Stage Management
THEA 465, Directing II
THEA 468, Business of Acting
THEA 476, Design for the Stage II
Total

And 3 credits from the following:

ENGL 344, American Drama	2
ENGL 380, Shakespeare	2
ENGL 462, Modern European Drama	2
ENGL 484, Restor & 18th Century Drama	2
Fotal	3

B.F.A. with a Major in Theatre Arts: Performance Track

Credits

Major Requirements

5 1	
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
ГНЕА 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
ГНЕА 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
ГНЕА 468, Business of Acting	3
ГНЕА 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

Major Requirements	Credits
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
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	

And 6 credits from the following:

ART	130,	230),]	Dr	av	viı	ıg	I	, I	Ι.			•			 				. (5
ART	120,	220),]	Pa	int	tin	ıg	I,	IJ	[.						 				. (5
Tota	1															 				.0	5

And 9 credits from the following:

ARCH 321, 322, History of Architecture I, II6
ADFH 310, History of Fashion
ADFH 315, 316 History of Interiors I, II
ATID 355, Flat Pattern Design & Draping
Fotal

Minor in Theatre Arts:

Students must take two of the following courses as part of the 23 credit minor:

Cro	edits
THEA 110, Intro to Theatre Arts and/or	3
THEA 180 Dramatic Lit & Style and/or	3
THEA 280 World Literature	3
Credits	6

General Studies Emphasis requires the additional

1 / creatts:
THEA 161, Acting I
THEA 201, Theatre Practice
THEA 270, Stagecraft OR
THEA 271, Costume Construction
THEA 275, Makeup Design I
THEA 365, Directing I
THEA 375, Intro to Stage Design
Total

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.nodak.edu/bistory

There are four options for the major in History. The B.A. degree with a major in History is recommended for students planning on graduate school or law school or who simply desire a rich liberal arts education. The B.S. degree with a major in History and an approved minor is recommended for a career in government or business. Students transferring to NDSU must complete at least 50 percent of their history credits at NDSU.

The following two options for the history major require 39 credits distributed as follows:

B.A. and B.S. with a Major 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.

College of Arts, Humanities and Social Sciences 51

Recommended Curriculum B.A. with a Major in History

	Credits
First Year	F S
ENGL 110, 120, College Composition, I, II 3	3 3
Foreign Lang 101, 102, First-Year	í 4
COMM 110, Fund of Public Speaking	3 –
HIST 100-200 level	3 3
UNIV 189, Skills for Academic Success 1	l –
Science & Technology	- 3
Wellness	2 -
Quantitative Reasoning	- 3
Totals \ldots $\overline{1}$	6 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	í 3
Social & Behav Sci	5 3
Totals \ldots $\overline{1}$	6 15
Third Year	
History Distribution Require & two sem seq	3 3

	-	-	
History Distribution Re	equirement .	3	3
Fine Arts			3
Cultural Diversity & Gl	obal Perspec	tives 3	3
Social/Behav Sci or Fin	e Art	3	
Free Electives		3	3
Totals			15

Fourth Year

1000000 1000	
HIST 489, Senior Seminar	3
HIST Electives in upper level 6	3
Free Electives	8
Totals	14
Curriculum Total	122

The third option prepares students for careers in secondary education. We advise students to double major in History and History Education with History as their primary major. This leads to a B.S. degree.

History education majors are required to complete 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.S. in History and 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.

Public History Option

A fourth option is Public History. The NDSU program was the first of its kind in the upper Midwest. The major requires 51 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 archival and museum work, historical editing, historic preservation, costume conservation, and archeology. The 18 credit supplementary vocational courses are divided into three tracks: 1) museum work, intended to prepare students for work as a curator, interpreter, or administrator in museums, 2) archival work, 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.

100-200 level courses (9-15 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 the Public History option are at the NDSU History Department homepage: www.ndsu.edu/ history.

Public History Core Requirements

ARCH 322, History of Architecture II	3
HIST 251, Intro to Public History	. 3
HIST 252, Intro to Museum Work	. 3
HIST 401, Archival Theory & Practice	. 3
HIST 403, Archival Photography	3
HIST 496, Field Experience (Approved Internship).	. 9
Total	24

Credits

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

	Creuns
ENGL 240 & 335 (or HUM 385)	6
UNIV 401, 402, 403, 404 or approved	
interdisciplinary course	3

Cusdita

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)	6
Electives at 300-400 level	9
Total	9

Two years of a foreign language, classical or modern, western or non-western, are required for both the major and the minor.

Recommended Curriculum Humanities Major

	Creatts
First Year I	7 S
ENGL 110, 120, College Composition I, II 3	3
UNIV 189, Skills for Academic Success 1	
Foreign language	4
Quantitative Reasoning	3
Science & Technology	3
Social & Behavioral Sciences	3
Wellness	
Totals \ldots $\overline{10}$	5 16
Second Year	
COMM 110 & Free Elective	3
Fine Arts Sequence	3
Foreign Language	3
Science & Tech & Free Elective 4	3
Social & Behavioral Sciences	3
Totals \ldots $\overline{10}$	5 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
Free Electives	3
Totals	5 15
Fourth Year	
HUM 304 (Humanities Tutorial) 3	2
History Electives	3
Humanities Electives	3
Free Electives	7
Totals	5 15
Curriculum Total	123

The dean of Arts, Humanities and Social Sciences administers the Humanities major and minor. Refer also to graduation requirements listed earlier in the academic policies section.

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:

Cradits

Humanities Minor Core Requirements

Ci cuito
ENGL 240 & 3356
Two upper-level sequences in philosophy, religion,
anthropology, history, literature, art history, history
of theatre, or history of music
UNIV 402, 403, 404 or approved interdisciplinary
course
Total

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, 24 credits must be taken from the required courses below. Six elective credits, which can be independent studies, complete the major.

Philosophy-Humanities Major Core Requirements

Recommended Curriculum Philosophy-Humanities Major

	Credits
First Year	F S
ENGL 110, 120, College Composition I, II	3 3
UNIV 189, Skills for Academic Success	1 -
PHIL 101 or HUM 256	3 -
PHIL 257/HUM 257	3 -
PHIL 210 or HUM 367	- 3
Quantitative Reasoning	- 3
Science & Technology	3 3
Social & Behavioral Science	3 3
Totals	16 15
Second Year	
СОММ 110	3 -
Minor or Foreign Language	3-4 3-4
Global Perspectives	- 3
Humanities/Fine Arts	3 3
PHIL 366/HUM 366	3 -
PHIL 487/HUM 487	- 3
Science & Tech & Free Elective	4 -
Wellness	- 2
Totals	6-17 14-15
Third Year	
PHIL 322 or HUM 358 or 359	3 -
PHIL 323 or PHIL/HUM 476 or 477	- 3
Social & Behavioral Science	3 -
Social Science or Fine Arts	- 3
Minor or Foreign Language	3 3
Minor or free elective.	6 6
Totals	15 15

T	¥7
rourin	rear

Totals 124	1.126
Totals 16	15
Minor or free elective	9
Cultural Diversity	
Cultural Diversity	

The 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 Credits

PHIL 101 Introduction to Philosophy or

HUM 256, Questions of Philosophy
PHIL 257/HUM 257, Traditional Logic
PHIL 366/HUM 366, Metaphysics
PHIL 210/HUM 210, Introduction to Ethics or
HUM 367, The Acting Person (Ethics)
PHIL 487/HUM 487, Aesthetics
Philosophy-Humanities electives
Total
Elective Dhilosophy Humanities Courses

Elective Philosophy-Humanities Courses

PHIL 215, Contemporary Moral Issues or

PHIL 216, Business Ethics
HUM 304, Humanities Tutorial 1-3
PHIL 359/HUM 359, Thomas Aquinas3
PHIL 486/HUM 486, Philosophy & Literature3
PHIL 487/HUM 487, Aesthetics
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

3

3

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/ndsu/academic/factsbeets/ abss/modlang.sbtml

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. 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. Programs for study abroad are available for those who desire the experience of living in another culture in addition to linguistic mastery.

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	Appropriate NDSU Language Course
No previous study or limited of	experience
(less than two high school	units/years)
in the language	Course 101
Two or three high school unit	s/years or
one year college credit	Course 201
Four or more high school unit	ts/years or
two years college credit; Ba	achelor of Arts
language requirement is sa	tisfiedCourse 311
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.

- The student has completed no previous college-level credit in that language;
- 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 course 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 Curriculum French as Example

		Credits	
First Year	F	5	
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
SOC 110, Intro to Sociology	3
UNIV 189, Skills for Academic Success 1	
Wellness	2
Totals	15

Second Year

BIOL 124, Environmental Science	
COMM 110, Fund of Public Speaking	3
ENGL 220, Intro to Lit	-
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	
PSYC 111, Intro Psychology	3
Totals	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 travel agency 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 progressive companies currently without 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/socantb

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), paleoanthropology (an interdisciplinary study of humans and their ancestors, their geochronology, physical structure, archaeological remains, and their habitats), and folklore (the study of expressive culture, particularly unrecorded traditions).

Anthropology consists of fours 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.

Credits

Recommended Curriculum Anthropology Major

First Year	F S
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 or	
ANTH 205, Human Origins or	
ANTH 206. Peoples of the World or	
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 Lang	- 6 6
Totals	17 15
Third Yoar	
STAT 330 Intro Statistics	3 -
Anthropology Electives	3 3
Anthropology Electives or	5 5
Other Electives at 300 /00 level	2 1
Humanities or Fine Arts	5 I 2
Minutes of File Arts	5 - 2 (
Science 8 Technicker Flucting Trade	5 0
Science & lechnology Elective W/lab	4
	15 14
Fourth Year	
ANTH 480, Development of Anth Theory or	
Anthropology Elective	- 3
ANTH 489, Capstone in Anthropology	- 1
ANTH 494, Independent Study or	
ANTH 496, Field Experience	2 -
Anthropology Electives	3 3
Anthropology Electives or	
Other Electives at the 300-400 level	3 3
Minor Electives or Free Electives	6 4
Totals	14 14

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 both a profession and a field of study addressing the five stages of disaster management: prevention, preparedness, mitigation, response, and recovery. The field covers natural and technological disasters, as well as issues of homeland security. The mission of the major is to create a cadre of graduates with extensive theoretical and applied knowledge in emergency management and disaster research.

Numerous career opportunities are available to those graduating with an emergency management major. Positions are available at all levels of government including city, county, state, and federal. A wide variety of local, national, and international voluntary organizations routinely need people trained in emergency management, and there is increasing emphasis on emergency management in the private, business sector. There has been, and likely will continue to be, an upward trend in the damage done by natural and technological disasters and the demand is likely to increase for people who can assist in the management of these disasters.

All aspects of society can be impacted by disasters, so the emergency management major is built on a core of sociology courses: ANTH 111, SOC 110, 340, 341, and 422. Related to this sociology core, the major requires STAT 330 as a prerequisite or corequisite for SOC 340, but STAT 330 does not count toward the 38 credits in the major. Additionally, the major includes two broad, introductory courses, EMGT 201 and SOC 420, plus four disaster stage courses: preparedness (EMGT 411), mitigation (EMGT 421), response (EMGT 431), and recovery (EMGT 483). To complete the major, students should take six credits of electives 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 disaster preparedness, mitigation, response, and recovery to natural and human made disasters, and consists of 18 credits. Students must take EMGT 201, SOC 420, and the following disaster stage courses: preparedness (EMGT 411), mitigation (EMGT 421), response (EMGT 431), and recovery (EMGT 483).

Recommended Curriculum Emergency Management Major

	Credits	
First Year	F	5
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	-
UNIV 189, Skills for Academic Success 1	-
Wellness	-
Aumanities & Fine Arts	6
Fotals	15

Second Year

EMGT 201, Intro/Emergency Mgmt	. 3	
Iumanities & Fine Arts	3	3
Science & Technology	3	3
Electives, Modern Lang or Minor	. 6	9
fotals	15	15

Third Year

SOC 340, 341, Soc Research Meth, Lab 3,1	
SOC 422, Dev/Social Theory	3
STAT 330, Intro Statistics	
SOC 420, Sociology of Disaster	
EMGT 411, Comm Disaster Preparedness	3
EMGT 421, Hazard Mitigation	3
Science & Technology/with Lab	4
Social/Behavioral Sciences	3
Electives or Minor	-
Totals	16
Fourth Year	
EMGT 431, Disaster Response Operations 3	-
EMGT 483, Holistic Disaster Recovery	3
Emergency Management Electives	3

EMGT 489, Capstone-Curriculum Total 122

Sociology Major

Sociology is the study of social interaction, social structure, and organized social and cultural patterns that comprise societies.

Curriculum flexibility allows majors to pursue various interests. Areas of study include small groups, population, inequality, diversity, gender, social change, families, community development, organizations, health care, and aging.

The 32 credit requirement includes the following core: ANTH 111, SOC 110, 340, 341, 422, and 489. (Note: An introductory statistics course is a prerequisite for SOC 340.) In addition to the 14 core credits, majors must complete 18 elective credits in sociology.

Recommended Curriculum Sociology Major

	Credits
First Year	F 5
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	-
UNIV 189, Skills for Academic Success 1	-
Humanities & Fine Arts	3
Electives, Modern Lang or Minor 3-	4 3-4
Totals $\ldots \ldots 1\overline{6}$	17 15-16
Second Year	
Humanities & Fine Arts	3
Science & Technology, Lab 4	3
Wellness	-
Electives, Modern Lang or Minor 6	59
Totals	5 15
Third Year	
SOC 340, 341, Soc Research Meth, Lab 3,	1 -
SOC 422, Dev/Social Theory	. 3
STAT 330, Intro Statistics	
Science & Technology	- 4

Sociology Electives	3
Social/Behavioral Sciences	3
Electives or Minor	3
Totals 16	16
Fourth Year	
SOC 400 Constants	

Curriculum Total	122-124
Totals	15 15
Electives or Minor	3 8
Sociology Electives	6 6
SOC 496 (optional)	6 -
SOC 489, Capstone	- 1

Sociology Minor

1

8

15

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, 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 Administration

www.ndsu.edu/cba Putnam Hall 105 (701) 231-8651 Jay A. Leitch, Dean

The teaching mission of the College of Business Administration is to provide students with a broad base of knowledge plus courses necessary for careers in a variety of public and private organizations.

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 Administration 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 Administration 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, an application fee, and a current NDSU transcript.

Admission to the professional program is based upon 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 Administration has specific policies on transfer course evaluations. Contact the CBA Student Service Center for more information.

Degree Programs

The College of Business Administration offers undergraduate programs leading to the Bachelor of Arts, 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.

Degree Requirements

All majors are required to complete all course requirements of one of the curricula in the college. Requirements for graduation are those in existence at 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 Administration are required to complete a three-credit practicum



experience while enrolled in the professional program. This requirement prepares students for the 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 415, Small Busines BUSN 486, Senior Thesis
- BUSN 480, Senior Thesis
- IME 456, Program and Project Management UNIV 397, Cooperative Education
- UNIV 397, Cooperative Edu 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.edu/cba/departments/ais.bomepage.sbtml

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 identify 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 Curriculum Pre-Accounting Major¹

First Year	F	\$
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

Credits

Wellness	
Totals	16
Second Year	
ACCT 200, 201, Elem of Accounting I, II 3	3
POLS 115, American Government	-
PSYC 111, Intro to Psychology	3
PHIL 210, Ethics	3
SOC 110, Intro to Sociology	-
STAT 330, Intro Statistics	-
STAT 331, Regression Analysis	2
Cultural Diversity Elective	3
Free Electives	2-3
Science & Tech, Lab Elective	-
Totals	16-17

Recommended Curriculum Accounting Major¹

	Cr	edit:
Third Year	F	5
ACCT 311, 312, Intermediate Acct 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, Practical Writing or		
ENGL 358, Intermediate Composition		- 3
MIS 370, Mgt Info Systems	3	
Totals	16	10

Accounting	Practicum ²	· · · · · · · · · · · · · · · · · · ·	3 Credits
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Fourth Year

ACCT 318, Taxation in Mgt Decisions 3	
ACCT 321, Govt/Not-for-Profit Acct	-
ACCT 421, Auditing I	-
ACCT 440, Mgt Control Systems	3
BUSN 340, Prin of Finance	-
BUSN 489, Strategic Mgt	4
300-400 Accounting Elective ³	3
300-400 Business Electives	3
Science & Technology Elective	2
Totals	15
Four-Year Curriculum Total	130

Crodits

Recommended Curriculum Accountancy Major¹

Third Year	F S
ACCT 311, 312, Intermediate Acct I, II 4	i 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
COMM 214, 216, 271, 308, or 315	- 3
MIS 370, Mgt Info Systems 3	, –
Totals	6 16
Fourth Year	
ACCT 321, Gov/Not-for-Profit Acct	. –
ACCT 418, 419, Tax Accounting I, II 3	5 3
ACCT 421, 422, Auditing I, II	5 3
BUSN 352, Operations Mgt	. –
BUSN 431, Business Law I	, –
ECON 324, Money & Banking	- 3
ENGL 320, Practical Writing or	
ENGL 358, Intermediate Composition	- 3
300-400 Business Elective ³	- 3
PSYC 322, Thinking & Making Decisions or	
HUM 256, Questions of Philosophy 3	, –
Science & Technology Elective	- 2
Totals	8 17

Fiftb Year

Accounting Practicum ² 3 Credits
Total
300-400 Level BUSN Elective ³
300-400 Level ACCT Elective ²
ENGL 320, 322, 323, 358, or 4583
BUSN 489, Strategic Management
ACCT 415, Advanced Accounting
0

Five-Year Curriculum Minimum 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 (ACCT 200 and 201), Intermediate Accounting (ACCT 311 and 312), plus nine 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

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.

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 the 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 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.

Credits

2

16

Credits

Recommended Curriculum Pre-Management Information Systems Major¹

	0.00000
First Year	F 5
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
Second Year	
ACCT 200, 201, Elem of Accounting I, II	3 3
CSCI 227, 228, Comp Fund I, II	3 3
PHIL 210, Ethics	- 3
SOC 110, Intro to Sociology	3 -
STAT 330, Intro to Statistics	3 -
STAT 331, Regression Analysis	- 2
Humanities & Fine Arts Elective	- 3

Recommended Curriculum Management Information Systems Major¹

Science & Technology Elective. 5

Third Year	F \$
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
CSCI 125, Beginning COBOL	.3 -
CSCI 315, Sys Analy & Design	.3 -
CSCI 316, Sys Testing & Main	- 3
ENGL 320, Practical Writing or	
ENGL 358, Intermediate Composition	- 3
Totals	15 15
Management Information Systems	
Practicum ²	3 Credits
Fourth Year	
BUSN 430, Legal/Social Envir of Busn	.3 -
MIS 375, Database Design	.3 -
MIS 470, Info Systems	- 3

MIS 375, Database Design	
MIS 470, Info Systems	3
BUSN 489, Strategic Mgt	
CSCI 345, Topics on Pers Comp 3	
CSCI 372, Comparative Languages	3
CSCI 489, Soc Impl of Comp	3
Computer Science Elective	
300-400 Level Busn Electives ³	3
Free Elective	3
Totals 16	15
Curriculum Total	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 Consult advisor for relevant 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/mmf. bomepage.sbtml

Business Administration Major

The Bachelor of Science degree with a major in Business Administration provides students with a broad base of knowledge in the 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 languages.

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 Curriculum Pre-Business Administration Major

	Cr	edits
First Year	F	5
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	
UNIV 189, Skills for Academic Success 1	
Humanities & Fine Arts Elective	3
Wellness	2
Totals	15

Second Year

ACCT 200, 201, Elements of Acct I, II 3	3
PSYC 111, Intro to Psychology3	-
RELS 210, Ethics	
COMM 110, Fund of Pub Speaking	3
STAT 330, Intro Statistics	
STAT 331, Regression Analysis	2
Cultural Diversity Elective	3
Free Elective	
Science & Technology Elective	4
Totals	15

Recommended Curriculum a Administra Malant

business Aunimistration Major-	
Third Year I	7 S
3USN 340, Prin of Finance	-
3USN 350, Found of Management 3	-
3USN 351, Found of Org Behavior	3
3USN 360, Found of Marketing 3	-
MIS 370, Mgt Info Systems	3
CON 324, Money & Banking	3
ENGL 320, Practical Writing or	
ENGL 358, Intermediate Composition 3	-
300-400 Level Finance Elective	3
300-400 Level Marketing Elective	3
Free Electives	-
Fotals \ldots $\overline{10}$	5 15
Bus Admin Practicum ² 3	Credits

Bus Admin Practicum²

Fourth Year

BUSN 352, Operations Mgt	
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	-
Intl Elective (BUSN 310, 435, 445,	
454, or 464) ³	3
300-400 Level ACCT, BUSN, or	
MIS Electives ⁴	6
Fotals	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 professional money management, marketing, human resource management, or electronic commerce. List of required courses for a concentration is available in the CBA Student Service Center.

Business Administration Minor

Majors outside the College of Business Administration 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 Administration. 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 AGEC and three credits at the 300-400 level in BUSN.

Logistics Minor

The College of Business Administration, in conjunction with the Upper Great Plains Transportation Institute and the Department of Agribusiness and Applied Economics, offers a minor in Logistics. 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 skills.

A minor in Logistics requires a minimum of 24 credits: BUSN 350, 352, 360, 481, AGEC 339, 378, 472, 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.

Certificate Programs

Certificate programs in Human Resource Management, Marketing, and Professional Money Management 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 CBA 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.

College of Engineering and Architecture

www.cea.ndsu.nodak.edu/ Engineering Center 203 (701) 231-7494 Otto J. Helweg, 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 and Construction, 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 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 on the campus each year. In addition, the Level I — Associate Constructor Certification Exam for American Institute of Constructors Certification Commission is offered each year. All engineering 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.

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 upper-division 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_ arcb/geneng.shtml

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/

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. For the program description, refer to the appropriate listing in the College of Agriculture, Food Systems, and Natural Resources section.

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, 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, Otto J. Helweg, PE Agricultural and Biosystems Engineering, Leslie Backer Architecture, Paul H. Gleye Civil Engineering, Frank Yazdani, PE Electrical and Computer Engineering, Daniel Ewert

Industrial and Manufacturing Engineering, David Wells

Mechanical Engineering, Bor Jang

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/

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 longrange 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:

- 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 fieldtraining program at an Air Force base the summer prior to their junior or senior year.

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. 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 — plus a tiered monthly allowance. 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 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 Bentson/Bunker Fieldhouse or visit our Website.

General Military Course

•					
			6	re	dits
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

Professional Officer Course

	creuns
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

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Department of Agricultural and Biosystems Engineering

www.ageng.ndsu.nodak.edu/

Agricultural and Biosystems Engineering Major

The Agricultural and Biosystems Engineering (ABEN) major is designed to educate men and women for careers that require the application of engineering, physical, and biological sciences to problems that involve living systems. Agricultural and biosystems engineers plan, design, develop, and test engineered products or systems for agricultural and biological industries and related environmental areas. Typical examples include mechanization and automation of agricultural production equipment and processes, design for food processing and packaging, storage systems for agricultural and other biological materials, environmental systems for plant and animal production, and natural resource management systems to improve environmental quality.Advances in biotechnology have created new opportunities for agricultural and biosystems engineers in biological and chemical production and the processing of biological materials.

The educational objectives of this major are to provide students with: a) technical knowledge and problem solving skills that are foundational to engineering, b) educational experiences that build interpersonal skills and the capacity for productive careers, and c) disciplinary knowledge and the educational depth and breadth to meet the challenges of changing careers and opportunities. 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 and Food Processing 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, bioresource, 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 Curriculum Agricultural and Biosystems **Engineering Major**

	Credits
First Year	
ABEN 110, Intro to Ag & Biosys Engr 2	
ABEN 189, Skills for Academic Success 1	-
CHEM 121, 122, Gen Chem I, II	3
ENGL 110, 120, College Comp I, II 3	3
MATH 165, 166, Calculus I, II 4	4
Humanities/Fine Arts Elective	-
ABEN 196, Field Experience 1	-
ME 212, Fund of Visual Communications	3
ME 221, Engineering Mechanics I	3
Totals	7 16
Second Year	
ABEN 255, Comp Aided Anal & Design 3	
ABEN 263, Biomaterials Processing	3
BIOL 150, General Biology I3	-
CE 309, Fluid Mechanics	3
MATH 128, Intro to Linear Algebra 1	-
MATH 259, Multivariate Calc 3	-
MATH 266, Differential Equations	3
ME 222, Engr Mech II	-
ME 223, Mech of Materials 3	-
PHYS 252, 252L, Univ Phys II, Lab	4,1
CSCI Programming Elective	3
Totals \ldots $\overline{10}$	5 17

Third Year

ABEN 377, Modeling in ABEN	3
CE 310, Fluid Mechanics Lab 1	-
ECE 301, Electrical Engineering I	-
ME 350, Thermodynamics/Heat Trnsfr	3
COMM 110, Fund of Pub Speaking 3	-
ABEN Electives	3
IME 440, Engineering Economy 2	-
Biological Science Elective	-
Social/Behavioral Sciences Elect	3
Statistics Elective	-
Technical Electives	6
Totals	18

Fourth Voar

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	-
Technical Electives	3
Biological Science Elective	-
Humanities/Fine Arts Elective	3
Social/Behavioral Sci Elective	-
Business/Communication Elective	3
Wellness	2
Totals	17
Curriculum Total	136

Agricultural and Biosystems Engineering Electives:

- ABEN 358 3, Electrical Energy Applications in Ag
- ABEN 383 3, Structural Design for Biosystems
- ABEN 452 3, Bioenvironmental Systems Design ABEN 458 - 3, Food Process Engineering
- ABEN 464 4, Resource Conservation and Irrigation
- Engineering
- ABEN 473 3, Agricultural Power
- ABEN 478 2, Machinery Analysis and Design

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 and Food Processing 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 & Landscape Architecture

www.ndsu.nodak.edu/arcb/

Architecture Maior

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.

In addition to required courses that relate closely to architecture itself, 20 percent of the credits required for the Bachelor of Architecture degree are electives. There are courses that the student chooses, either within categories or with little restriction, except for the requirement that a portion of them be selected to pursue a single special interest. With the remainder of the elective credits, a student is encouraged to gain the broad general education that is needed for the architectural profession.

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 five-year undergraduate program leading to the Bachelor of Architecture degree is offered through the department. This program is fully accredited by the National Architectural Accrediting Board and the degree is recognized by the National Council of Architectural Registration Boards as a first professional degree. At the end of four years a student may elect to receive a Bachelor of Science in Environmental Design (nonprofessional degree).

The total number of credits required for the professional degree is 160 and the four-year degree requirement is 129.

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. The NDSU architecture program is accredited, based on conformance with established educational standards.

The four-year pre-professional degree, where offered, is not accredited by NAAB. The preprofessional degree is useful for those wishing a foundation in the field of architecture as preparation for either continued education in a professional degree program or for employment options in architecturally related areas.

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 Curriculum Bachelor of Architecture

	Cr	edits
First Year	F	\$
ANTH 111, Intro to Anthro	. 3	-
ARCH 132, Arch Graphics		2

ARCH 171, 172, Envir Design I, II 3	3
ART 130, Drawing I	3
COMM 110, Fund Public Speaking3	-
ENGL 110, 120, College Composition I, II 3	3
MATH 104, 105, Finite Math, Trig	3
SOC 110, Intro to Sociology	3
UNIV 189, Skills for Academic Success 1	
Totals	17
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Second Year	
ARCH 299/299, Digital Means	_
ARCH $2/1$, $2/2$, Arch Design I, II 4	4
ARCH 321, 322, History of Arch 1, 11 3	3
ARCH 326, Design Process & Methods	2
PHYS 120, Fund of Physics	3
PSYC 111, Intro to Psyc	_
General Education Electives	4
Wellness	-
Totals 17	16
Third Year	
ARCH 341, 342. Arch Structures I. II 3	3
ARCH 351. Materials & Const	_
ARCH 352. Envir Control Sys	4
ARCH 371, 372. Arch Design III. IV	4
LA 341. Site Dev & Det L	_
Gen Educ or Humanities Electives 3	6
Totals	17
100000 11111111111111111111111111111111	- /
Fourth Year	
ARCH 451, Envir Control Sys II	-
ARCH 452, Constr Detailing	3
ARCH 471, 472, Adv Arch Design I, II 5	5
ARCH 521, 522, 523, 524, 525, 526,	
527, 528, Hist/Theory Seminar	2
300 - 500 Level Electives	6
Totals	16
FIGL Vor	
ADCU 5(1 Arch December 2)	
ARCH 501, Arch Programming	-
ARCH 5/1, 5/2, Adv Arch Design III, IV6	8
AKUH 582, Prof Practice	-
AKCH 589, Prot Seminar	_
$300 - 500$ Level Electives \dots 3	7
Totals	15
Curriculum Total	160

Note: Electives must include six credits of humanities, six credits of science plus a one credit lab, and 27 credits at the 300 - 500 level. 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 Curriculum B.S. with a Major in **Environmental Design**

	Credit
First Year	F S
ANTH 111, Intro to Anthro	3 –
ARCH 132, Arch Graphics	- 2
ARCH 171, 172, Envir Design I,II	3 3
ART 130, Drawing I	- 3
COMM 110, Fund Public Speaking	3 -
ENGL 110, 120, College Composition I, II	3 3
MATH 104, 105, Finite Math, Trig	3 3
SOC 110, Intro to Sociology	- 3
UNIV 189, Skills for Academic Success	1 –
Totals	6 17

Second Year

Second Ieur	
ARCH 299/299, Digital Means	
ARCH 271, 272, Arch Design I, II	
ARCH 321, 322, History of Arch I, II 3	
ARCH 326, Design Process & Methods	
PHYS 120, Fund of Physics	
PSYC 111, Intro to Psyc 3	
Gen Education Electives 3	

4

3

2

3

 $\mathbf{4}$

Wellness	-
Totals 17	16
Third Year	
ARCH 341, 342, Arch Structures I, II 3	3
ARCH 351, Materials & Const 4	
ARCH 352, Envir Control Sys I	4
ARCH 371, 372, Arch Design III, IV 4	4
LA 341, Site Dev & Det I	
Gen Education or Humanities Electives 3	6
Totals 17	17
Fourth Year	
ARCH 451, Envir Control Sys II	
ARCH 452, Const Detailing	3
ARCH 471, 472, Adv Arch Design I, II 5	5
ARCH 521, 522, 523, 524, 525, 526,	
527, 528, Hist/Theory Seminar	2
300 - 500 Level Electives	5
Totals	15
Curriculum Total	129

Note: Electives must include six credits of humanities, six credits of science plus a one credit lab, and 25 credits at the 300 - 500 level. 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 50 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 entering 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 Curriculum Landscape Architecture Major

6	redits
First Year F	\$
ANTH 111, Intro to Anthro	
ART 130, Drawing I	
COMM 110, Fund of Public Speaking	3
CSCI 114, Microcomp Packages	3
ENGL 110, 120, College Comp I, II 3	3
LA 132, Intro to LA	2
LA 171, Envir Design I	-
LA 172, Envir Design II	3
MATH 104 or 146, Fin Math or App Calc I 3	_
UNIV 189, Skills for Academic Success1	_
Wellness	2
Totals \ldots $\overline{16}$	16
Second Year	
BIOL 150, Gen Biology 1	-
LA 242, Elements of Surveying	2
ENGL 320, Practical Writing	3
GEOL 105, 105L, Phys Geol I, Lab 3,1	
LA 271, 272, Landsc Arch I, II	4
LA 299 Digital Means	-
LA 331, Intro to Planting Design	-
PSYC 111 or Soc 110, Intro to Psyc or	
Intro to Soc	3
Computer Science Elective	3
Totals 16	15
Third Year	
ARCH 321, History of Arch I	-
LA 322, History of Landscape Arch	4
LA 341, 342, 344,	
Site Dev & Det I, II, Lab	3,2
LA 371, 372, Landsc Arch III, IV	4
PLSC 355, Woody Plants	
Elective/Option Area	3

Fourth Year

LA 441, Site Dev & Det III	-
LA 471, 472, Adv LA I, II	6
LA 491, Contemp Issues	2
LA 552, Adv Landscape Planning	2
Electives/Option Area7	7
Totals	17

Fifth Year

1 yu 1eu	
LA 531,Adv LA Planting Design 4	-
ARCH 582, Prof Practice	
LA 561, LA Programming2	
LA 571,Adv LA Design III6	
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 and Construction

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:

- a) technical knowledge, design capability, and problem solving skills fundamental to a career in civil engineering,
- b) knowledge and skills necessary for comparative evaluation of design alternatives,
- c) necessary communication skills to successfully practice the civil engineering profession, and
- d) 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

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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.

Recommended Curriculum Civil Engineering Major

All Civil Engineering students at NDSU are required to have a minimum institutional gradepoint 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.

0	credits
First Year F	\$
CE 111, Intro Civil Engr	2
CHEM 121, 121L, 122, 122L	
Gen Chemistry I, II, Labs	3,1
ENGL 110, 120, College Comp 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	
Totals	16

Second Year

CE 204, Surveying
COMM 110, Fund of Public Speaking
GEOL 105, Physical Geology
IME 460, Evaluation of Engr Data
MATH 128, 259, Intro Linear Algebra,
Multivariate Calculus 1,3
MATH 266, Diff Equations
ME 212, Fundmtls of Visual Comm3
ME 222, Engr Mechanics II
ME 223, Mech of Materials
PHYS 252, University Physics II
Totals

3

3

3

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3

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16

Credits

Third Year

CE 303, Civil Engr Materials	3
CE 309, Fluid Mechanics	-
CE 316, Soil Mechanics	-
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	-
ENGR 402, Engr Ethics & Soc Resp 1	-
ME 350, Therm/Heat Transfer	-
Wellness	-
Totals	18

Fourth Year

CE 310, Fluid Mechanics Lab 1	
CE 404, Reinforced Concrete	-
CE 444, Structural Steel Design	-
CE 483, Contracts & Specs	3
CE 489, Senior Design	2
ENGR 312, Impact of Tech II	-
IME 440, Engr Economy	2
General Education Electives	-
Technical Electives	8
Totals	15
Curriculum Total	129

Technical Electives

Fall

CE 410, 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 478/678, Water Quality Management	. 3
CE 720, Continuum Mechanics	. 3
CE 770, Haz Waste Site Remediation	.3

Spring:

Construction Management and Engineering Division

The mission of the Division 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 Curriculum Construction Engineering Major

	Credits
First Year	F S
CHEM 121, 121L, Gen Chem I, Lab 3,	,1 -
CM&E 111, Intro to CM&E	l –
ECON 201, Prin of Microeconomics	3 –
ENGL 110, 120, College Comp I, II 3	3 3
MATH 165, 166, Calculus I, II	ú 4
ME 212, Fund of Visual Comm	- 3
ME 221, Engr Mech I.	- 3
PSYC 111, Intro to Psychology	- 3
UNIV 189, Skills for Academic Success 1	l –
Wellness	2 -
Totals \ldots $\overline{1}$	8 16
Second Year	

CE 204, Surve	eying.			•																	4	
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CM&E 365, Collst Salety	2
COMM 110, Fund of Public Speaking	3
GEOL 105, Physical Geology	
MATH 128/259, Intro to Linear	
Algebra/Multivariate Calc 1,3	
MATH 266, Intro to Diff Equations	3
ME 222, Engr Mechanics II	-
ME 223, Mechanics of Materials	3
PHYS 251, 252, Univ Phys I, II	4
Humanities/Diversity Elective	3
Totals	18
Third Year	
CE 303, Civil Engr Materials	3
CE 309, Fluid Mechanics	
CE 21(Call Masharian 2	

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CHAR 205 C

1800 1000	
CE 303, Civil Engr Materials	3
CE 309, Fluid Mechanics	-
CE 316, Soil Mechanics	
CE 343, Structural Analysis	4
CM&E 301, Const Tech & Equip	4
CM&E 310, Quality Control Mgmt	2
CM&E 315, Specs & Contracts	
CM&E 370, Intro Cost Estimating2	
CM&E 411, Const Cost Estimating	2
IME 440, Engr Economy	
STAT 330, Intro Statistics	
Totals	15
Fourth Year	
BUSN 431, Business Law I	3
CE 404, Reinforced Concrete	
CE 430, Timber & Form Design	3
CE 444, Struct Steel Design	
CM&E 403, Sched & Proj Control 4	
CM&E 409, Highway Const	2
CM&E 412, Construction Management	3
CM&E 489, Construction Design	3
ECE 301, Electrical Engr I	
ENGR 311, History of Technology in America 3	
ENGR 402, Engr Ethics & Soc Resp	1
IME 455, Mgmt People System 2	
Technical Elective	3
Totals	18

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 Curriculum Construction Management Major

	C/ C	euns
First Year	F	\$
CHEM 121, 121L, Gen Chem 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 Comm		3
PHYS 211, 212, College Phys I, II	. 3	3

Cuadita

UNIV 189, Skills for Academic Success1	-
Humanities/Diversity Elective	3
Wellness	2
Totals	17
Second Year	
ACCT 102, Fund of Acct	3
CE 204, Surveying	
CM&E 205, Building Const	3
CM&E 325, Fluid Mechanics for Tech	3
CM&E 385, Const Safety	2
ECON 105, Elements of Economics 3	-
ENGR 311, History of Technology in America 3	-
GEOL 105, Physical Geology	-
ME 221, Engr Mechanics I	-
ME 223, Mechanics of Materials	3
PSYC 111, Intro to Psychology	3
Totals	17
Third Year	

BUSN 350, 351, Found of Mgmt,	
Found Organizational Behavior 3	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	
CM&E 320, Soils & Foundations 4	-
CM&E 370, Intro to Cost Est	
CM&E 411, Const Cost Estimating	2
IME 440, Engr Economy	-
STAT 330, Intro Statistics	-
Totals	17

Fourth Year

CM&E 403, Sched & Proj Control 4	
CM&E 412, Const Mgmt	3
CM&E 413, Const Capstone	2
CM&E 420, Labor Productivity	3
CM&E 421, Elect & Mech Const3	
CM&E 430, Land Development	
CM&E 450, Steel Design for Tech 3	
CM&E 453, Concrete Design Const	3
Busn Elective	3
Technical Elective	
Totals	14
Curriculum Total	130

Department of **Electrical** and **Computer Engineering**

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 electrical and computer engineering students to become competent engineers.
- 2. Promote life-long learning practice through continuous curriculum review, research, design, and other scholarly activities.
- Stimulate student and faculty professional 3. 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.

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.

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. Further, an institutional GPA of 2.0 or above is required.

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.

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 Curriculum Computer Engineering Major

	Credits
First Year	F S
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 251 ¹ , Univ Physics I <i>or</i>	
ME 221 ² 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	$17-17^{1}$	(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 221 ¹ , Engr Mechanics I or		
ME 222 ² 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 Eqtns		3
(Math/Science Elective ²)		(3)
Totals	18 14 (17	²)-17

Third Year

ECE 321, Electronics I	
ECE 343, Signals & Systems 4	
ECE 351, Applied EM	
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 Sci Electives	3
Totals 16	17
Fourth Year	
CprE Core Elective	3
CSCI 474, Operating Sys Concepts 3	
ECE or Engr Sci Elective	3
ECE 403, 405 Design II, III2	3
ECE 443, Communications I 4	
Wellness Elective	
ENGR 402, Ethics & Social Resp	1
Humanities, Social Sci Electives	3
Totals	13
<i>Curriculum Totals</i>	31) ²

1 Using physics sequence.

² 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:

CbrE Core Electives (9 credits)

-	
ECE 3	74, Computer Org & Architecture
ECE 3	75, Digital Sys Design/Implement
ECE 42	23, Digital Electronics
ECE 47	70, Digital Systems II

Engineering Science Electives (0-3 credits)

CSCI 366, Files for Database Systems
CSCI 372, Comparative Languages
CSCI 426, Intro to Artificial Intelligence
CSCI 458, Microcomputer Graphics
CSCI 459, Local Area Networks
CSCI 467, Algorithm Analysis
CSCI 475, Operating Systems Design
CSCI 477, Object-Oriented Systems

FCF Flectives (0-3 credits)

ECE 411, Optics for Engr & Scientists3
ECE 421, Communication Circuits
ECE 425, Intro Semiconductor Devices
ECE 444, Applied Dig Signal Process
ECE 445, Communications II

ECE 453, Signal Integrity
Compatability
ECE 457, Optical Signal Transmission
ECE 461, Control Systems
ECE 463, Digital Control
ECE 471, Comp Syst Design & Implementation3
ECE 483, Instrumentation for Engineers
ECE 494, Individual Study
ECE 496, Field Experience

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 Curriculum Electrical Engineering Major

	Cr	edits
First Year	F	5
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 251 ¹ , University Physics I or		
ME 221 ² , Engr Mechanics I		4(3)
Totals 1	7-16 ¹	(152)
Second Year	F	5
Corequisite Science Lab	1	
EE 206, 311, Circuit Analysis I/II	4	4
ENGR SCI Elective ¹ or		
ME 222 ² . Engr Mechanics II	3	_
MATH 265. Calculus III.	4	-
PHYS 252. Univ Physics II	4	
COMM 110. Fund of Public Speaking.		3
ENGR Sci ¹ or Math/Sci ² Elective		3
MATH 266. Differential Equations		3
(Math/Sci ² Elective)		(3)
Social Science Elective		3
Totals 10	5-16 ¹ ((19^2)
Third Year		
ECE 321 Electronics I	5	_
ECE 343 Signals & Systems	4	_
FCF 351 Applied FM	4	_
Humanities Elective	3	-
FCF Electronics Elective		3
FCF 341 Random Process		3
FCF 401 Design I		1
EEE 401, Design 1		4
Math/Science Elective		3
Wellness Elective	_	2
Totals	16	16
	10	10
Fourth Year		
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 Resp	. 1	
Humanities, Soc Sci Elective	3	3
Totals	16	13

Curriculum	Total	 	 1261-(1282)
			/ 0

¹ Using physics sequence.

² 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:

EE Core Electives (3 out of 4)

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

ECE Electives

ECE Electrices
ECE 373, Assembly Lang/CPU Arch
ECE 374, Computer Organization
ECE 375, Dig Sys Design & Implem
ECE 411, Optics for Engineers & Scientists
ECE 431, Power Systems
ECE 433, Power Systems Design
ECE 444, Digital Signal Processing
ECE 445, Communications II
ECE 453, Signal Integrity
ECE 455, Electromagnetic Compatibility
ECE 457, Optical Signal Transmission
ECE 463, Digital Control
ECE 470, Digital Systems II
ECE 471, Comp Sys Design & Implem
ECE 483, Instrumentation for Engineers
ECE 485, Biomedical Engineering
ECE 487, Cardiovascular Engineering
ECE 494. Individual Study
ECE 496. Field Experience
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Engineering Science Electives

0 0
CE 309, 310, Fluid Mechanics, Lab
CSCI 161, Comp Science II
CSCI 366, Files for Database Sys
CSCI 372, Comparative Prog Lang
CSCI 426, Intro to Artificial Intelligence
CSCI 458, Microcomputer Graphics
CSCI 459, Local Area Networks
CSCI 467, Algorithm Analysis
CSCI 474, Operating Systems Concepts
CSCI 475, Operating Systems Design
CSCI 477, Object-Oriented Systems
IME 440, Engineering Economy 2-3
IME 456, Program & Project Mgt3
IME 461, Quality Assurance & Control
ME 221, Engineering Mechanics I
ME 222, Engineering Mechanics II
ME 223, Mechanics of Materials
ME 350, Thermodynamics/Heat
ME 411, Nuclear Engineering
PHYS 363, Optics
PHYS 402, Engineering Physics II

Math/Science Electives

nums/ serence Encentes
BIOL 150, General Biology I
CHEM 122, General Chemistry II
CHEM 341, Organic Chemistry I3
CHEM 364, Physical Chemistry I4
CSCI 222, Discrete Mathematics
CSCI 235, 236, Theoretical Comp Sci I, II 3,3
MATH 270, Intro to Abstract Math
MATH 429, Linear Algebra
MATH 420, 421, Abstract Algebra I, II
MATH 450, 451, Real Analysis I, II
MATH 452, Complex Analysis
MATH 480, Applied Diff Equations
MATH 481, Fourier Analysis
MATH 483, Partial Dif Equations3
MATH 488, 489, Numerical Analysis I, II
PHYS 350, Modern Physics
PHYS 401, Engr Physics I
PHYS 485, Quantum Mechanics I
STAT 450, Stochastic Processes
STAT 451, Bayesian Stat Decision Theory
STAT 468, Probability & Math Stat I

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/

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 commercial 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 aircraft manufacturing, 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 worldclass 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.

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.
- Engage in effective learning in topics and areas relevant to professional advancement and to enhancing the quality of personal life.
- Participate effectively in multidisciplinary teams in both leadership and followership roles.
- 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 Curriculum Industrial Engineering and Management Major

	Credits
First Year F	' S
CHEM 121, 121L, General Chemistry I, Lab . 3,1	l
ENGL 110, 120 College Composition I, II3	3
IME 111, Intro to IME	1
IME 112, Comp/Software Apps Engr	2
MATH 165, 166, Calculus I, II	4
ME 212, Fund of Visual Comm	3
ME 221, Engineering Mechanics I	3
UNIV 189, Skills for Academic Success 1	
Computer Science Elective	
Totals	16

Second Year

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	
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 ¹ 3	3
Totals	17

Third Year

1.500 1000	
IME 450, Systems Engr & Mgmt 3	-
IME 460, Evaluation of Engr Data	-
IME 461, Quality Assurance & Cntrl	3
IME 470, Operations Research I	3
IME 472, Simulation Bus & Ind Sys	3
General Education Electives	3
Science & Engineering Elective	-
Technical Electives	3
Wellness	-
Totals	15

Fourth Year

104115 1041	
ENGR 402, Engr Ethics & Soc Resp1	
IME 456, Program & Project Mgmt	3
IME 462, Total Qlty in Indl Mgmt 3	-
IME 480, Prod & Inventory Cntrl 3	-
IME 482, Automated Mfg Systems3	-
IME 485, Ind & Mfg Facility Design	3
General Education Elective	6
Science & Engineering Elective	-
Technical Electives	3
Totals	15
Curriculum Total	128

¹ 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 IME 310, 311, 440, 452, 453, 455, 456, and 462.

Industrial Engineering and Management Areas of Empbasis

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
- Specialized manufacturing processes (electronics, aircraft, plastics and composites)

These topical areas are also available for postgraduate 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.

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 MfgE program will be able to:

- 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.
- 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.

- 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.
- Effectively communicate complex technological concepts, issues and professional details to a variety of audiences.

At graduation, MfgE 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. MfgE 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 Curriculum Manufacturing Engineering Major

	Credits
First Year F	5
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
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	16
100015	10
Second Year	
COMM 110, Fund of Public Speaking 3	
IME 311, Work/Station Design	3
IME 330, Mfg Processes I	
IME 440, Engineering Economy	3
MATH 128, Intro to Linear Algebra 1	-
MATH 259, Multivariate Calc	
MATH 266, Intro to Diff Equations	3
ME 222, Engr Mechanics II	
PHYS 252, 252L Univ Physics II, Lab	4.1
Science & Engineering Electives ¹ 3	3
Totals	17
1771. Jun J. XZ	
Third Year	
IME 380, CAD/CAM for Mig	
IME 430, Process Engineering	-
IME 431, Production Engineering	3
IME 460, Eval of Engr Data 3	
IME 461, Quality Assurance & Cntrl	3
ME 331, Engr Materials I	4
General Education Elective	
Science & Engineering Elective	3
Technical Electives	3
Wellness Elective	-
Totals 17	16
Fourth Year	
FNGR 402 Fnor Ethics & Soc Resp. 1	
IMF 432 Composite Materials Mfg 3	
IME 456 Program & Project Mant	3
IME 490, Prod & Inventory Cntrl 3	5
IME 400, 1100 & inventory Chili	
IME 480 Mfg Engineering Capstone	2
Ceneral Education Electives 2	5
Technical Electives	2
Totals	3
Totals	120
Curricuum 10101	128

1 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 aircraft manufacturing (IME 420, 422), 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 MfgE major. It is suggested that students confer with their academic advisor for assistance in choosing the most appropriate optional courses. The MfgE major requires that students select 12 credits of approved elective courses, and these may be selected in the following special interests:

- Electronics manufacturing
- Aircraft manufacturing
- Process engineering

Production and manufacturing systems engineering

These topical areas also are available for postgraduate 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.

Department of Mechanical Engineering and Applied Mechanics

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 goal of the Mechanical Engineering curriculum at NDSU is to produce baccalaureate-level graduates who are well prepared to accept engineering positions in industry and government or to pursue advanced degree studies. Our mission is to educate undergraduate and graduate students in the fundamentals of the discipline and to prepare graduates who 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 educational program objectives are the following:

- To provide our students with a fundamental understanding of the engineering sciences in the areas relevant to the field of mechanical engineering.
- To provide our students with the ability to develop the skills and apply the knowledge and tools relevant to the field of mechanical engineering.
- To provide our students with the team-working skills and communications skills required for effectively interacting with people of varying technical background.
- To provide our students with a broad view of the context in which their designs will be implemented and the corresponding impact on society.

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.

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 add 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.

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.

Credits

Recommended Curriculum Mechanical Engineering Major

All Options

First Year F	\$
CHEM 121, 122, General Chemistry I, II3	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 Comm	3
ME 221, Engr Mechanics I	3
Humanities/Soc Sci Electives 6	
Wellness	2
Totals	18
Second Year	
COMM 110, Fund of Public Speaking	3
IME 330, Mfg Processes I	
MATH 129, Basic Linear Algebra 2	
MATH 259, Multivariate Calc	
MATH 266, Intro Diff Equations	3
ME 213, Modeling of Engr Systems	3
ME 222, Engr Mechanics II	
ME 223, Mech of Materials	
ME 351, Thermodynamics I	3
PHYS 252, 252L, Univ Physics II, Lab	4,1
(P&C Option) Social Sci Elective	
Humanities Elective	
Totals	17

Standard Option

-		
Third Year	F	- 5
ECE 301, 306 Electrical Engr I, Lab	3	1
ECE 303, Electrical Engr II		3

College of Engineering	and Architecture	6
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Engr 320, Technical Comm	
ME 331, Engr Materials I 4	-
ME 352, Fluid Dynamics	-
ME 423, Interm Mech of Materials	3
ME 454, Heat & Mass Transfer	3
ME 455, Mech Systems Lab I	1
Technical Elective ¹ 3	3
Totals	14

Fourth Year

ENGR 402, Engr Ethics & Soc Resp 1	-
ME 412, Engr Measurements	-
ME 421, Theory of Vibrations	3
ME 442, Machine Design I	-
ME 456, Mech Systems Lab II 1	-
ME 461, Design Project I	-
ME 462, Design Project II	3
Social Science Elective	3
Technical Electives ¹	6
Totals	15
Curriculum Total	128

Coatings and Polymeric Materials Option

	_	
Third Year	F	5
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 320, Technical Comm	. 3	-
ME 331, Engr Materials I	. 4	-
ME 352, Fluid Dynamics	. 3	-
ME 423, Intermed Mech of Materials		3
ME 455, Mech Systems Lab I		1
Technical Electives ¹		6
Totals	16	18

Fourth Year

ENGR 402, Engr Ethics & Soc Resp	1
ME 412, Engr Measurements	3
ME 421, Theory of Vibrations	3
ME 442, Machine Design I	-
ME 454, Heat & Mass Transfer	-
ME 456, Mech Systems Lab II 1	-
ME 461, Design Project I	-
ME 462, Design Project II	3
ME 473, Engr Plastics for Design	-
ME 474, Mech of Comp Materials	3
P&C 474, 484, Coatings I, Lab	
P&C 475, Coatings II	3
Totals	16
Curriculum Total	140

¹ Technical electives: Student must select five of the following courses: ME 471, 473, 474, 475, 477, 481, 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/

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 Curriculum Military Science Minor

	Cred	lits
Basic Course	F	\$
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
Advanced Course		
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

College of Human Development and Education

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 Food and Nutrition (dietetics) program is accredited by the American Dietetic Association. The Interior Design program is accredited by the Foundation for Interior Design Education Research and the Facility Management curriculum meets guidelines set by the International Facility Management Association. 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, Educational Administration, Sport and Recreation Management, Exercise Science, Nutrition, Physical Education, 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 program (Ph.D.) has an interdisciplinary approach, which allows students to focus on one of three tracks: Wellness, Counselor 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 options: Institutional Analysis and Occupational and Adult Education. For more complete details, see the Graduate Bulletin online at 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 099 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

General Education:	Credits
First-year experience	1
Communication	9
СОММ 110	(3)
ENGL 110, 120	(6)
Quantitative Reasoning	3
MATH 104, 146 or higher, CSCI 122, CSCI	125, <i>or</i>
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
Demotor and also to shade a second to	

Requirements also include a course in cultural diversity, a course in global perspectives, and integration of the following within existing courses: computer usage, 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.

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

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 Community Health Option Dietetics Elementary Education (Offered via VCSU) Facility Management Health Education Hospitality and Tourism Management Human Performance and Fitness Interior Design Physical Education Recreation Management Retail Merchandising Option School Health Option Therapeutic Recreation Option 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 Speech Communication

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 may be completed concurrently with a CDFS major from NDSU.

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 Minors

Interdisciplinary study involves an integration of more than one perspective on a topic. Programs in two interdisciplinary minors are available: Gerontology and Women's Studies.

Gerontology Minor

The College of Human Development and Education and the College of Arts, Humanities, and Social Sciences at NDSU sponsor this program. Tri-College University resources are used 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

Crei	dits
Area 1: Social Gerontology	
SOC 440, Sociology of Aging	3
Area 2: Developmental Psychology of Agin	ng
Select one of the following courses:	.0
CDFS 460, Adult Development & Aging	3
PSYC 471, The Psychology of Aging	3

Area 4: Macrosystems

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
CDFS 491, Seminar/Aging related 1-3
H&CE 468, Family Life & Adult Educ Programs3
HNES 452, Nutrition, Health, & Aging
SOC 426, Sociology of Medicine
SOC 441, Sociology of Death
SOC 442, Current Issues in Medicine
SOC 491, Seminar/Aging related Var

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:

Required core courses:	Credits
WS 350, Perspectives in Women's Studies	
And three of the following courses:	
ADFH 382, Women in Management	
CDFS 242, Couples, Marriages & Family	
CDFS 468, Families & Work	

COMM 412, Gender & Communication
ENGL 330, British/American Women Writers3
ENGL 331, Contemporary Women Writers
HIST 260, Women in America
POLS 350, Gender Issues & the Law
POLS 351, Women & Politics
SOC 412, Sociology of Sex Roles
SOC 413, Sociology of Work
SOC 424, Feminist Theory & Discourse

Other appropriate courses if approved by the coordinator of the Women's Studies program.

Elective courses (Additional credits, for a total of 18 credits including any course(s) listed on pg. 71, but not taken for core credit)

Credits

CDFS 230, Life Span Development
CDFS 353, Children, Families, & Public Pol
CDFS 462, Family Crisis
CDFS 475, Children & Families Across Cultures3
ENGL 335, Multicultural Writers
HIST 259 Women in European History 1400-18003
HIST 265, Families in America
PSYC 210, Human Sexuality
PSYC 250, Developmental Psychology
SOC 202, Minorities & Race Relations
SOC 417, Sociology of the Family
SOC 439, Social Change
WS 491 ¹ , Women's Week of Awareness
494 Independent Study in appropriate area 1-3
Total minimum $\overline{18}$

At least three credits must be taken in each of the two colleges offering the minor — the College of Human Development and Education and the College of Arts, Humanities and Social Sciences.

¹ Women's studies credits are linked with Women's Week participation and course work, and they must be approved by the Women's Studies coordinator.

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)
- American Society of Interior Designers (ASID)
- Association for Leisure and Recreation
- Child Development and Family Science Club
- Eta Sigma Delta (honorary)
- Fashion, Apparel, and Business Organization (FABO)
- Health, Nutrition and Exercise Sciences Organization 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 Program

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

Students graduating with majors in Apparel and Textiles, Facility Management, 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 four majors: Apparel and Textiles, Facility Management, 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 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 curatorship, 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. The 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 Curriculum Apparel and Textiles Major Apparel Studies Option

Cr		edits
First Year	F	5
ADFH 150, Design Fundamentals-Lecture		3
ADFH 171, Fashion Dynamics	. 3	
ADFH 172, Product Development		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 or	
SOC 110, Intro to Sociology	3
CSCI 116, Business Use of Computers or	
CSCI 114, Microcomputer Packages 3-4	
COMM 110, Fund of Public Speaking	3
MATH 104, Finite Mathematics or	
MATH 146 or higher	3
Humanities Elective	
Totals	18

Second Year

ADEH Elective

ADFH 155, Apparel Construction & Fit or	
ADFH 370, Sewn-Prod Manufact & Anal 3	
ADFH 271, Visual Merchandising & Promo	3
ADFH 281, Aesthetic Anal in Bus & Society	3
COMM 216, Intercultural Comm or	
Alternative	
ECON 105, Elements of Economics 3	
COMM 200, Intro to Media Writing or	
Alternative	3
Humanities Elective	
Science and Technology, Lab	3,1
Elective	
Totals	13
Third Year	
ADFH 366, Textiles	
ADFH 367, Textiles Laboratory 1	
ADFH 310, History of Fashion	
ADFH 385, Global Fashion Economics 3	
ADFH Elective	
ADFH Elective	3

	5
Minor Course	
Minor Course	3
HD&E 320, Professional Issues	1
Elective	3
Science and Technology	3
Totals \ldots 16	16
Fourth Year	
ADFH 410, Dress in World Cultures 3	
ADFH 481,A &T Capstone Experience	3
ADFH 486, Dress & Human Behavior3	-
ADFH 491, Seminar 1	-

2

ADFH 491, Seminar 1	
ADFH 496, Field Experience1	
Elective	
ADFH Elective	3
Wellness	
ADFH Elective	3
Minor Courses	6
Minor Course	
Totals	15
Curriculum Total	123

Recommended Curriculum Apparel and Textiles Major Retail Merchandising Option

Interior Merchandising Emphasis

	Cre	edits
First Year	F	5
ADFH 150, Design Fundament	tals-Lecture	3
ADFH 151, Design Fundament	tals-Studio	3
ADFH 160, Interior Design Fac	Mgmt Careers 1	
ADFH 161, Interior Graphics I	l	3
ADFH 171, Fashion Dynamics	3	
ADFH 172, Product Developm	1ent	3
HD&E 189, Skills for Academic	c Success 1	
COMM 110, Fund of Public Sp	eaking3	
ENGL 110, College Composition	on I 3	
ENGL 120, College Composition	on II	3
MATH 104, Finite Mathematics	s3	
Totals		15
Second Year		
ADFH 250, Interior Design I-L	ecture 3	-
ADFH 251, Interior Design I-St	tudio 3	-
ADFH 271, Visual Merchandisi	ng & Promo	3

Elective	-
ACCT 102, Fund of Accounting	
CSCI 116, Business Use of Computers or	
CSCI 114, Microcomputer Packages	3-4
PSYC 111, Intro to Psychology	
COMM 200, Intro to Media Writing or	
Alternative	3
ECON 105, Elements of Economics	3
Science & Technology	3
Totals	15-16
Third Year	
ADFH 315, History of Interiors I	
ADFH 366, Textiles	
ADFH 367, Textiles Lab	
ADFH 316, History of Interiors II	3
BUSN 350, Found of Management	
BUSN 360, Found of Marketing	3
COMM 216, Intercultural Comm or	
Alternate	
HD&E 320, Professional Issues	1
Humanities Elective	
Humanities Elective	3
BUSN Elective	3
Elective	3
Totals	16
Summor	
ADFH 496, Field Experience	3
Fourth Year	
ADFH 372. Global Retailing	
ADFH 470. Retail Financial Mgt & Control	4
ADFH 481, Apparel & Textiles Capstone Exp	3
ADFH 491, Seminar (Apparel & Textiles Topic) 1	-
ADFH 496, Field Trip	
BUSN 362, Found of Retailing	3
BUSN Elective	-
BUSN Elective	3

cience & Technology, Lab	1
Wellness	- 2
TAT 330, Intro Statistics	
Totals	7 13
Curriculum Total	122-125

Recommended Curriculum Apparel and Textiles Major Retail Merchandising Option

Textile Product Merchandising Emphasis

		Credits
First Year	F	\$
ADFH 150, Design Fund-Lecture		3
ADFH 171, Fashion Dynamics	. 3	-
ADFH 172, Product Development		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 or		
CSCI 114, Microcomputer Packages		3-4
Humanities Elective	. 3	-
Totals	13	15-16
C		
Summer		1.0
ADFH 196/496, Field Experience (optional).		1-2
Second Year		
PSYC 111, Intro to Psychology	. 3	-
ADFH 271, Visual Merchandising & Promo .		3
ADFH 281, Aesthetic Anal in Bus & Society .		3
ENGL 215, Writing for Work or		
Alternative	. 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
Third Year	
ADFH 310, History of Fashion	-
ADFH 366. Textiles	-
ADFH 367. Textiles Lab	-
ADFH 370, Sewn-Product Mfg & Analysis	3
ADFH 372. Global Retailing	_
ADFH 496, Field Trip 1	-
HD&E 320, Professional Issues	1
BUSN 350, Found of Management	-
BUSN 360, Found of Marketing	-
BUSN 362, Found of Retailing	3
BUSN Elective	3
ADFH Elective	3
Elective	3
Totals 17	16
Summer	
ADFH 496, Field Experience	3-5
Fourth Year	
ADFH 385, Global Fashion Economics 3	-
ADFH 410, Dress in World Cultures 3	-
ADFH 470, Retail Financial Mgt & Control	3
ADFH 481, Apparel & Textiles Capstone Exp	3
ADFH 486, Dress & Human Behavior3	-
ADFH 491, Seminar (Apparel & Textiles Topic) 1	-
BUSN Elective	-
BUSN Elective	3
COMM 216, Intercultural Communication or	
Alternative	3
STAT 330, Intro Statistics	-
Totals	12
Curriculum Total	-125

Recommended Curriculum Apparel and Textiles Minor Retail Merchandising Option

Soft Goods Emphasis

First Year	Credits
ADFH 171, Fashion Dynamics	3
ADFH 370, Sewn-Product Mfg & Analysis	3
ADFH 281, Aesthetics Anal in Bus & Society	3
ADFH 366, Textiles	3
ADFH 372, Global Retailing	3
ADFH 385, Global Fashion Economics	3
ADFH 470, Retail Financial Mgt & Control	4
Fotal	

Option in Retail Management

(for Business Administration Majors)
ADFH 171, Fashion Dynamics
ADFH 172, Product Development
ADFH 372, Global Retailing
ADFH 470, Retailing Financial Mgt & Control4
BUSN 360, Found of Marketing3
BUSN 362, Found of Retailing
ADFH Elective
Fotal

Option in Consumer Textiles

ADFH 281, Aesthetic Anal in Bus & Society	. 3
ADFH 366/367, Textiles & Textiles Lab 3	,1
ADFH 385, Global Fashion Economics	. 3
ADFH 465, Textile Product Analysis	. 3
ADFH Electives ¹	. 9
Total	22

Option in Apparel Studies

ADFH 155, Apparel Construction & Fit or

ADFH 370, Sewn-Product Mfg & Analysis3
ADFH 171, Fashion Dynamics
ADFH 281, Aesthetic Anal in Bus & Society
ADFH 366/367, Textiles & Textiles Lab
ADFH Electives ¹
ADFH Electives &/or Supporting Course ¹
Fotal

1 With approval of minor advisor

Option in Occupational Fashion and Apparel

This option is planned for Family and Consumer Science Education majors who wish to teach occupational home economics courses. To meet vocational certification for teaching the Fashion and Apparel occupations in Minnesota consult with academic advisors in Family and Consumer

Science Education.

Facility Management Major

Students are prepared to coordinate the physical workplace with the people and work of an organization by learning to integrate concepts from the disciplines of environmental design, specifically in relation to building systems, space planning, and textile product specification; business administration; and behavioral and engineering sciences as they relate to project and construction management. Facility managers are an important link in the integration of telecommunications, information management systems, maintenance, security and general administrative services for hospitals, hotels, financial institutions, school systems, and large corporations. Planning, management, and decision-making skills are strongly emphasized. In addition, each student is required to complete a full-semester field experience in a professional work setting between the junior and senior years. This provides students with practical experience sought by employers.

The curriculum for this major meets guidelines set by the International Facility Management Association.

Graduation requires an institutional cumulative grade-point average of 2.5 or higher.

Note: Transfer credits in facility management from other institutions must have grades of C or better to be accepted for the facility management program at NDSU.

Credits

Recommended Curriculum Facility Management Major

First Year F	5
ACCT 102, Fund of Accounting	3
ADFH 160, Interior Design & FM Careers 1	
ADFH 161, Interior Graphics I	3
COMM 110, Fund of Public Speaking	3
CSCI 116, Business Use of Computers or	
CSCI 114, Microcomputer Packages 3-4	
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	
PSYC 111, Intro to Psychology	-
Wellness	2
Totals	5 17
Second Year	
ADFH 252, Interior Design II-Lecture (contract) -	3
ADFH 253, Interior Design II-Studio (contract)	3
ADFH 263, Interior Technology I 3	
ADFH 363, Interior Technology II	3
ADFH 366, Textiles	
ADFH 367, Textiles Laboratory 1	-
ADFH 368, Interior Materials & Maint	3
STAT 330, Intro Statistics	-
ENGL 215, Writing for Work or	
ENGL 320, Practical Writing 3	-
Science & Technology, Laboratory 3,1	
Science Elective	3
Totals 17	15

Third Year	
ADFH 365, CADD for Interiors	-
ADFH 380, Facility Operations & Analysis 3	-
ADFH 491, Seminar	1
BUSN 350, Found of Management	-
BUSN 347, Princ of Real Estate	3
BUSN 351, Found of Org Behavior	3
CM&E 315, Specifications & Contracts 3	-
Elective	3
HD&E 320, Professional Issues	1
IME 311,Work/Sta Design & Measurement	3
Humanities Elective	-
Totals	14
Summer Session	
ADFH 496, Field Experience	6
Fourth Year	
ADFH 480, Facility Design & Mgt3	
ADFH 482, Facility Mgt Capstone Exp	3
ADFH 491, Seminar	
BUSN 340, Principles of Finance 3	
BUSN Elective	
Elective	3
Humanities Elective	-
BUSN Elective	3
IME 456, Program & Project Mgt	3
Totals	12

Recommended Curriculum Facility Management Minor

(Some courses are offered on a rotational basis. Please check with the department.)

Curriculum Total 123

Credits
ADFH 366, Textiles
ADFH 367, Textiles Laboratory
ADFH 263, Interior Technology
ADFH 363, Interior Technology II
ADFH 368, Interior Materials & Maintenance or
ADFH 480 Facility Design & Mgmt
ADFH 380, Facility Operations & Analysis
ADFH 491, Facility Management Seminar1
ADFH Elective
Total

Facility Management Minor -Interior Design Majors Only

micrior Design Majors Only
ADFH 380, Facility Operations & Analysis
ADFH 480, Facility Design & Management
ADFH 491, Facility Management Seminar 1
ACCT 102, Fund of Accounting
BUSN 350, Found of Mgmt (Prereq: Psyc 111)3
IME 311, Work Station Design & Measurement3
PSYC 111, Intro to Psychology
Total

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 Curriculum Hospitality and Tourism **Management Major Lodging Management Option**

	Credits
First Year 1	5 S
ENGL 110, College Composition I 3	
ENGL 120, College Composition II	3
ADFH 140, Intro to Hospitality Industry 3	
ADFH 141, Tourism & Travel Management	3
HD&E 189, Skills for Academic Success 1	
Quantitative Reasoning	3
Social & Behavioral Science	
PSYC 111, Intro to Psychology	3
Elective	
Wellness	3
Totals \ldots $\overline{1}$	3 15

3

3

3

1

3

1

14

3

3

3

1

Second Year

CSCI 116, Business Use of Computers or
CSCI 114, Microcomputer Packages 3-4
CHEM 117, Chemical Concepts/Appl or
CHEM 121, General Chemistry3
ACCT 102, Fund of Accounting
ECON 105, Elements of Economics
COMM 110, Fund of Public Speaking 3
HNES 261, Food Selection/Prep Principles 3
HNES 261L, Food Selection/Prep Lab 2
Science & Technology
Science & Technology Lab
Humanities & Fine Arts Elective
Elective
Totals 14-15

Third Year

ADFH 241, Hospitality Accounting3
ADFH 360, Front Office Management
ADFH 368, Interior Materials & Maintenance –
ADFH 381, Hospitality Marketing & Sales
BUSN 350, Found of Management 3
BUSN 360, Found of Marketing
Humanities & Fine Arts Elective
HD&E 320, Professional Issues
ADFH 491, Seminar 1

BUSN Elective	3
Science & Technology Elective 1	
Elective	3
Totals 17	16
Summer Session	
ADFH 496, Field Experience	-
Fourth Year	
ADFH 403, Resort & Spa Operations3	-
ADFH 496, Study Tour	1-3
ADFH 467, Hospitality Law	
ADFH 384, Beverage Operations	
ADFH 479, Hospitality Industry Mgmt Strat	3
ADFH 491, Seminar 1	
ADFH 401, Convention & Meeting Planning	3
ADFH 405, Casino Operations	
BUSN Electives	6
Totals	13-15
Curriculum Total	122

Recommended Curriculum Hospitality and Tourism Management **Restaurant Management Option**

0	redits
First Year F	5
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
Social & Behavioral Science	
PSYC 111, Intro to Psychology	3
Elective	
Wellness	3
Totals	16
Second Year	
CSCI 116, Business Use of Computers or	
CSCI 114, Microcomputer Packages 3-4	
CHEM 117, Chemical Concepts/Appli or	
CHEM 121, General Chemistry3	-
ACCT 102, Fund of 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
Totals	13
Third Year	
ADFH 241, Hospitality Accounting3	
ADFH 381, Hospitality Marketing & Sales	3
HNES 361, Food Production Mgmt	3
HNES 361L, Food Production Mgmt Lab	2
BUSN 350, Fund of Mgmt	
BUSN 360, Fund of Marketing 3	
Humanities & Fine Arts Elective	
HD&E 320, Professional Issues	1
BUSN Elective	3
Science & Technology Elective 1	
Elective	1
ADFH 491, Seminar1	
Totals 17	13
Summer Session	
ADEH 496 Field Experience -	3
horn 190, rich Experience	5
Fourth Year	
ADFH 496, Study Tour	1-3
ADFH 467, Hospitality Law	
ADFH 384, Beverage Operations	
ADFH 400, Food, Bev, Labor Cost Control 3	
ADFH 479, Hospitality Industry Mgmt Strat	3
ADFH 491, Seminar	
ADFH 402, Professional Catering Mgmt	3
	2

HNES 460, Foodservice Systems	
BUSN Elective	3
BUSN Electives	3
Totals	16-18
Curriculum Total	. 122

Recommended Curriculum Hospitality and Tourism Management Minor

Creaus
ADFH 140, Intro to Hospitality Industry3
ADFH 141, Tourism & Travel Management
ADFH 241, Hospitality Accounting
ADFH 491, Seminar1
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

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 Foundation for Interior Design Education Research (FIDER).

Recommended Curriculum Interior Design Major

	Credits
First Year 1	F S
ADFH 150, Design Fund Lecture	
ADFH 151, Design Fund Studio	
ADFH 160, Interior Design & FM Careers 1	-
ADFH 161, Interior Graphics I	. 3
COMM 110, Fund of Public Speaking	. 3
CSCI 116, Business Use of Computers or	
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 or	. 3
Supporting Course	. 3
Totals	15 15
Second Year	
ADFH 250, Interior Design I Lecture 3	
ADFH 251, Interior Design I Studio 3	
ADFH 252, Interior Design II Lecture	. 3
ADFH 253, Interior Design II Studio	. 3
ADFH 263, Interior Technology I 3	
ADFH 363, Interior Technology II	. 3
Science & Technology Elective	. 3
Science & Technology Laboratory	- 1
Social & Behavioral Science	3
ART 210, Art History I	
Wellness	
Totals \ldots $\overline{1}$	7 16
Third Year	

Third Yean

ADFH 315, History of Interiors I	
ADFH 316, History of Interiors II	3
ADFH 350, Interior Design III Lecture 3	
ADFH 351, Interior Design III Studio 3	
ADFH 352, Interior Design IV Lecture	3
ADFH 353, Interior Design IV Studio	3
ADFH 365, CADD for Interiors	3
ADFH 366, Textiles	
ADFH 367,Textiles Lab	
ADFH 368, Interior Materials & Maintenance	3
ADFH 491, Seminar	1
HD&E 320, Professional Issues	1
Science & Technology Elective	
Totals	17
Summer Session	
ADFH 496, Field Experience	6
Fourth Year	
ADFH 450, Interior Design V Lecture 3	
ADFH 451, Interior Design V Studio 3	
ADFH 452, Comprehensive Int Design Proj	6
ADFH 460, Professional Practice	3
ADFH 491, Seminar 1	
Supporting Courses	3
Electives	
Totals	12
Curriculum Total	130

Recommended Curriculum Interior Design Minor

Credits
ADFH 150, Design Fund Lecture
ADFH 151, Design Fund Studio
ADFH 160, Interior Design & Facility Mgmt Careers 1
ADFH 161, Interior Graphics I
ADFH 250, Interior Design I or
ADFH 252, Interior Design II (Lecture)
ADFH 251, Interior Design II or
ADFH 253, Interior Design II (Studio)
ADFH 315, History of Interiors I
ADFH 316, History of Interiors II
Total

Interior Design Minor rchitecture Maiore Only

Architecture majors Only
ADFH 160, Interior Design Careers1
ADFH 250, Interior Design I or
ADFH 252, Interior Design II (Lecture)
ADFH 251, Interior Design II or
ADFH 253, Interior Design II (Studio)
ADFH 261, Interior Graphics II
ADFH 315, History of Interiors I or
ADFH 316, History of Interiors II
ADFH Electives ¹
Total
1 Choose 12 additional credits from ADEH 250/251

252/253, 263, 315/316, 363, 365, 380, 480, and 491.

Department of Child Development and Family Science

www.ndsu.edu/cdfs

The mission of the Department of Child Development and Family Science (CDFS) is to provide 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 two options: child development and family science. 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: All majors are required to complete the following set of common core courses

Credits

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 or	
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.

For students who are enrolled in the Valley City State University Elementary Education program taught on the NDSU campus, the Department of Child Development and Family Science also offers the opportunity to obtain an NDSU B.S. degree with a major in Child Development and Family Science, child development option. Students must complete 30 credits in CDFS along with the Elementary Education requirements.

Child Development option requirements

All of the following:	Credits
CDFS Core	12
CDFS 320, Prenatal, Infant/Toddler Developme	nt 3
CDFS 330, Child Development	3
CDFS 341, Parent-Child Relations	3
CDFS 424, Observation & Assessment of Children	en3
CDFS 425, Children & Stress	3
CDFS 450, Adolescent Development	3
CDFS 460, Adult Development & Aging	3
CDFS 475, Children & Family Across Cultures .	3
CDFS 496, Field Experience	8
CDFS 488, Exceptional Child & Family	3
CDFS Electives	9
Total	

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

• • •	
All of the following:	Credits
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, Family Crisis	3
CDFS 475, Children/Families Across Cultures	3
CDFS 482, Family Dynamics of Aging	3
CDFS 483, Family Wellness	3
And six credits from the following huma development courses:	n

······································
CDFS 320, Prenatal, Infant & Toddler Development3
CDFS 330, Child Development
CDFS 450,Adolescent Development
CDFS 460. Adult Development & Aging

And six credits from the following family economics courses:

ccononico com oco
CDFS 186, Consumer & Society
CDFS 468, Families & Work
CDFS 477, Financial Counseling
Total

Recommended Curriculum Child Development Family Science

	Option	
	Cbild Devel.	Fam. Sci.
First Year		
CDFS 135, Family Science	3	3
CDFS 230, Life Span Development		3

Obtion

Elective	9
COMM 110, Fund of Public Speaking 3	3
ENGL 110, College Composition I 3	3
ENGL 120, College Composition II 3	3
HD&E 189, Skills for Academic Success 1	1
PSYC 111, Intro to Psychology	3
CDFS Electives	-
Wellness	-
Totals	28
Second Year	
CDFS 330. Child Development	
CSCI 116. Business Use of Computers or	
CSCI 114, Microcomputer Packages 3-4	3-4
SOC 110, Intro to Sociology	3
CDFS Core	15
CDFS Electives	3
Humanities & Fine Arts Elective	3
Quantitative Reasoning	3
Science and Technology w/lab	3,1
Science & Technology	
Electives	-
Totals	34-35
Third Year	
CDFS 320, Prenatal, Infant & Toddler Dev 3	-
CDFS 341, Parent-Child Relations	-
CDFS 353. Children, Family/Public Policy 3	3

CDFS 320, Prenatal, Infant & Toddler Dev 3	
CDFS 341, Parent-Child Relations3	
CDFS 353, Children, Family/Public Policy 3	3
CDFS 357, Personal & Family Finance	3
CDFS 425, Children & Stress	-
CDFS 403, Research Methods in CDFS 3	3
CDFS 450, Adolescent Development 3	-
CDFS 475, Children/Fam Across Cultures3	-
HD&E 320, Professional Issues 1	1
CDFS Electives	6
Humanities & Fine Arts Electives	3
Science & Technology Elective	3
Wellness	2-3
Electives	6
Totals	30-31

Fourth Year

CDFS 424, Observ & Assess of Children 3	-
CDFS 460, Adult Development & Aging 3	-
CDFS 485, Capstone Experience or	
CDFS 491, Seminar: Sr. Thesis	3
CDFS Core	3
CDFS 496, Field Experience	8
CDFS 488, Exceptional Child/Family 3	
CDFS Elective	3
Elective	14
Totals	31
<i>Curriculum Totals</i>	122

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.

CDFS/Elementary Education Dual Degrees

Students may concurrently earn a degree in Elementary Education from Valley City State University and a degree in Child Development and Family Science (Child Development option) from North Dakota State University while located on the NDSU campus. It allows the student to earn two degrees from two universities in the time frame it takes to usually earn one baccalaureate degree. See department for details. **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

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 (teaching and non-teaching), and Recreation Management. Minors offered are Coaching, Nutrition (Food Science option), Health Education, and Physical Education.

Athletic Training Major

The Athletic Training major is a four-year program accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). 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 observational phase (first year) and the curriculum phase (second, third, and fourth year). Students in the curriculum phase must receive a B or higher in all athletic training curriculum courses.

Observational Phase (must be completed in *first year):* During the observational 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 HPER 217 Personal and Community Health 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;
- 4. Fifty hours of observation.

Curriculum Phase:

In order for a student to move from the observational phase to the curriculum phase they must apply to the program and meet the following list of requirements:

- 1. Meet the four minimum standards listed above
- 2. Submit application, two letters of recommendation, essay,
- 3. Complete formal interview with certified athletic trainers,
- 4. A physical exam signed by physician,
- Complete Technical Standards Form signed 5. by a physician,
- 6. Criminal background check,
- 7. Signed compliance/consent form,
- 8. TB test,
- 9. Immunizations including Hepatitis B vaccine,
- 10. Purchase professional liability insurance,
- 11. Join the state organization,
- 12. Submit unofficial transcript.

Once a student has been formally accepted into the curriculum 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 NATABOC 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, Moorhead 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/Health South, and other related sites.

During your duration in the Athletic Training program all athletic training students must complete the following:

Attend one state meeting and one district meeting (during three years in the program). You will be required to submit a two-page paper on what you learned. In addition:

Second Year Students:

- 1. A letter grade of C or better earned in the following courses by the end of the spring semester of the second year in the program.
 - a. BIOL 220 and BIOL 221, Human Anatomy and Physiology
 - b. BIOL 220L and BIOL 221L, Human Anatomy and Physiology Lab
- 2. Must receive a B or higher in all athletic training curriculum courses.
- 3. Purchase National Athletic Trainers Association Membership (spring semester only).

Third and Fourth Year Students:

- a. Must received a B or higher in all athletic training curriculum courses.
- b. Renew Professional Liability Insurance.
- c. Renew National/District/State Athletic Trainers Association Membership.

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 National Athletic Trainers' Association Board of Certification (NATABOC) exam. The successful completion of a major in Athletic Training and NATABOC exam provides career opportunities in high schools, colleges/ universities, professional sports, sports medicine clinical settings, industrial settings and corporate fitness settings.

Recommended Curriculum Athletic Training

Credits

S

Observational Phase - First Year	F 5
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 Anatomy & Physiology	c .
L Lab.	1 -
MATH 103 College Algebra or	-
MATH 104 Finite Mathematics	3 -
HNFS 260 Medical Terminology	- 1
HNES 181 Taping/Devices/Equipment	3
HPEP 217 Personal/Community Health	- 3
PIOL 221 Human Anatomy & Physiology II	- 3
BIOL 221, Human Anatomy & Physiology II.	- 3
BIOL 2211, Human Anatomy & Physiology	1
	- 1
ENGL 120, College Composition II.	- 3
HNES 491 Seminar in AT Anatomy	- 3
Totals	16 17
Curriculum Phase - Second Year	
COMM 110 Public Speaking	3 _
CHEM 117 Chemical Concepts	
& Applications	2
UNES 240 Emorgon gy Bospongo	2 -
HINES 240, Elliergency Response	
HIVES 281, INJURY RECOG & EVALOF	2
Lower Extremity	.3 -
HNES 284, Clinical Experience 1	.3 -
PHYS 120, Fund of Physics	- 3
PSYC 111, Intro to Psychology	- 3
PHAR 170, Common Medicine & Diseases	- 2
HNES 285, Clinical Experience II	- 3
HNES 381, Injury Recog & Eval of	
Upper Extremity	- 3
HNES 271, Tech of Strength & Conditioning .	- 3
Totals	15 17
Curriculum Phase - Third Year	
Humanities (Cultural Diversity)	2
HNES 265 Kinesiology & Diomechanics	2 -
IINES 366, Kinesiology & Diomechanics Lab	1 -
HIVES 300, Killeslology & Biolifectianics Lab	1 -
HIVES 582, INJ RECOG & EVAL OF HEAD,	2
HNES 384, Inerapeutic Exercise	.3 -
HNES 386, Clinical Experience III	.3 -
HNES 385, Therapeutic Modalities	- 3
Humanities (Global Perspective)	- 3
HNES 387, Clinical Experience IV	- 3
HNES 465, Physiology of Exercise	- 3
HNES 466, Physiology Exercise Lab	- 1
HNES 383, Psychosocial Aspect of Injury	- 3
Totals	16 16
Constanting Diagonal Torritory	
<i>Curriculum Phase - Fourth Year</i>	2
HNES 496, FE/Fall Camp Hours	- 5
HNES 487, Admin Athletic Training Program .	
HNES 488, Clinical Experience V	- 3 -
PSYC 350, Research Methods I	- 3
STAT 330, Intro Statistics	- 3

HNES 455, Sports Nutrition	3
HNES 486, Medical Aspects of Athletic Train	3
HNES 489, Athletic Training Capstone	3
Social/Behavioral Sci (PSYC 212)	3
Totals 15	12
Curriculum Total	124

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 Curriculum Dietetics

Coordinated Program in Dietetics (CPD)

<i>First Year</i> ANTH 111, Intro to Anthropology CHEM 121, General Chemistry I CHEM 121L, General Chemistry I Lab .	F 3 1 	<i>s</i> - - 3
ANTH 111, Intro to Anthropology CHEM 121, General Chemistry I CHEM 121L, General Chemistry I Lab .		
CHEM 121, General Chemistry I CHEM 121L, General Chemistry I Lab .		- 3
CHEM 121L, General Chemistry I Lab .	· · · · · 1	- 3
	· · · · · · -	3
CHEM 122, General Chemistry II		
CHEM 122L, General Chemistry II Lab.		1
ECON 201, Principles of Microeconom	acs or	
ECON 202, Principles of Macroecon	omics	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 or		
MATH 103, College Algebra	3	
PSYC 111, Intro to Psychology		3
HNES 141, Food Sanitation		1
Humanities & Fine Arts Elective		3
Totals	14	17
Second Year		
MICR 202, Intro to Microbiology	2	

MICR 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 or	
CSCI 114, Microcomputer Packages	3-4
HNES 250, Nutrition Science	-
HNES 251, Nutrition, Growth	
& Development	3
HNES 261, Food Selection & Preparation3	-
HNES 261L, Food Selection & Prep Lab 2	-
BIOL 221, Human Anat & Physiology I	3
BIOL 221L, Human Anat & Physiology I Lab	1
Electives	
Totals	17-18
Third Year	

VETS 115, Medical Terminology or

HNES 260, AT Medical Terminology	1
BUSN 350, Found of Management	3
HNES 340, Community Health Nutrition 3	
HNES 351, Metabolic Basis of Nutrition 4	
HNES 354, Intro to Med Nutr Therapy	3
HNES 354L, Intro to Med Nutr Therapy Lab	2
HNES 361, Food Production Mgt	3
HNES 361L, Food Production Mgt Lab	2
HD&E 320, Professional Issues	1
STAT 330, Intro Statistics	
Humanities & Fine Arts Electives 6	
Totals	15

Fourth Year

HNES 440, Nutrition Educ &

Counseling Skills	-
HNES 458, Adv Med Nutrition Therapy 4	-
HNES 458L, Adv Med Nutrition Therapy Lab 3	-
HNES 460, Foodservice Systems	-
HNES 460L, Foodservice Systems Lab 3	-
HNES 480, Dietetics Practicum	12
Totals	12
Curriculum Total	122

Recommended Curriculum Dietetics

Didactic Program in Dietetics (DPD)

	Credits
First Year	F S
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 201, Principles of Microeconomics or	
ECON 202, Principles of Macroeconomics	- 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 or	
MATH 103, College Algebra	3 -
PSYC 111, Intro to Psychology	- 3
HNES 141, Food Sanitation	- 1
Humanities & Fine Arts Elective	- 3
Totals	14 17
Second Year	
BIOC 260. Elements of Biochemistry	- 4
MICR 202. Intro to Microbiology	2 -
MICR 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 or	-
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 I	- 3
BIOL 221L, Human Anat & Physiology I Lab	- 1

Electives	-
Totals	17-18
Third Year	
VETS 115, Medical Terminology or	
HNES 260, AT Medical Terminology	1
BUSN 350, Found of Management	3
HNES 340, Community Health Nutrition 3	
HNES 351, Metabolic Basis of Nutrition 4	
HNES 354, Intro/Medical Nutrition Therapy	3
HNES 361, Food Production Mgt	3
HNES 361L, Food Production Mgt Lab	2
HD&E 320, Professional Issues	1
STAT 330, Intro Statistics	-
Humanities & Fine Arts Electives 6	-
Totals	13

Fourth Year

HNES 440, Nutrition Educ

& Counseling Skills	-
HNES 458, Adv Medical Nutrition Therapy 4	-
HNES 460, Foodservice Systems	-
HNES 481, Didactic Capstone	2
HNES 491, Seminar, Dietetic Intern Applic 1	-
Electives	12
Totals	14
Curriculum Total	122

Recommended Curriculum Nutrition Minor Food Service Option

-
Credits
HNES 141, Food Sanitation
HNES 261, Food Selection & Prep Princ
[Prereq: Chem 117 or 121]
HNES 261L, Food Selection & Prep Princ Lab2
HNES 361, Food Production Mgt
HNES 361L, Food Production Mgt Lab2
Nutr 240, Principles of Nutrition or
HNES 250, Nutrition Sci
[Prereq: CHEM 117 or 121]
HNES 460, Foodservice Systems
Curriculum Total

Recommended Curriculum Nutrition Minor

Credits
HNES 250, Nutrition Sci [Prereq: CHEM 117-121] $\dots 3$
HNES 251, Nutrition, Growth, & Development3
HNES 351, Metabolic Basis of Nutrition
[Prereq: CHEM 240, BIOC 260]
HNES 354, Intro Medical Nutrition Therapy3
HNES 340, Community Health Nutrition3
HNES 440, Nutrition Educ & Counseling Skills $\ldots \ldots 3$
<i>Curriculum Total</i>

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®.

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 fouryear 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 Curriculum Human Performance and Fitness

	Credits
First Year H	7 S
BIOL 220, Human Anat & Physiology I3	-
BIOL 220L, Human Anat & Physiology I Lab 1	
BIOL 221, Human Anat & Physiology II	3
BIOL 221L, Human Anat & Physiology II Lab	1
CSCI 114. Microcomputer Packages or	
CSCI 116 Business Use of Computers -	3-4
ENGL 110 College Composition I 3	-
FNGL 120 College Composition II	3
HD&F 189 Skills for Academic Success	-
HNES 110 Intro to HPER 1	_
HNES 170 Intro to Human Performance	
& Fitness 2	_
HDEP 217 Dersonal & Community Health	2
MATH 10/ Einite Mathematics	5
Social & Bohavioral Sciences Elective	2
Totala	<u> </u>
lotais 14	4 10
Second Year	
CHEM 117, Chemical Concepts & Appli 3	
COMM 110, Fund of Public Speaking	3
HNES 270, Consumer Issues in Food & Nutr	3
HNES 271, Tech of Strength Conditioning	3
HNES 272, Tech of Cardio Conditioning3	-
HNES 210. First Aid & CPR	2
Humanities Electives	
Electives	_
Social & Behavioral Sciences Elective	3
Totals	5 14
And to di NZ	
Inita Year	
HNES 250, Nutrition Science	-
HNES 251, Nutrition, Growth, & Dev	3
HNES 365, Kinesiology & Biomechanics 3	-
HNES 366, Kinesiology & Biomech Lab 1	
HNES 455, Sports Nutrition	3
HNES 465, Physiology of Exercise	3
HNES 466, Physiology of Exercise Lab	1
HNES 470, Activity Benefits & Exerc	
Prescription	3
HNES 491, Seminar	1
HNES 496, Field Experience	1
Electives) –
Totals 17	7 15
Fourth Year	
HNES 467 EKG Monitoring Physiology 2	-
HNFS 471 Fitness Programming & Mot 3	
HNFS 472 Exercise Testing & Application 3	_
HNES 475 Human Performance & Fitness	
Internship (Capstone)	12
UNES 406 Eield Experience	12
Flectives	-
Totala 75	- 12
Totals	5 12
<i>Curricuum Iotal</i>	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:

Teaching Option

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 Curriculum Physical Education: Teaching

	Credits
First Year	F S
BIOL 220, Human Anat & Physiology I	; -
BIOL 220L, Human Anat & Physiology I Lab 1	-
BIOL 221, Human Anat & Physiology II	- 3
BIOL 221L, Human Anat & Physiology II Lab	- 1
COMM 110, Public Speaking	- 3
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	2 -
HNES 152, Prof Prep in Middle School	
Activities	- 3
HPER 217. Personal/Community Health	- 3
PSYC 111. Intro to Psychology	; -
Totals	4 16
Second Year	
CSCI 116, Business Use of Computers or	
CSCI 114, Microcomputer Packages	- 3-4
HNES 153, Prof Prep in HS Activity 3	; –
HPER 154, Prof Prep/Elem Sch Activity	- 3
HNES 210, First Aid & CPR	2 -
HNES 253, Motor Learning & Performance	- 3
CDFS 230, Life Span Development or	
PSYC 250, Developmental Psychology 3	; –
Electives	<u>6</u> 4
SOC 110, Intro to Sociology	- 3
Quantitative Reasoning Elective	; –
Totals \ldots $\overline{1}$	7 16-17
1477 • 1 × 7	
Ibira Year	
EDUC 300 Orientation to Elementary leach . 2	- 2
EDUC 321, Intro to Teaching	; –
EDUC 322, Educational Psychology	, –
EDUC 381, Early Experience	-
HNES 300, Curr, Stand & Assessment in PE 3	; -
HNES 350, Fitness Edu/Act/Mat	- 3
HNES 352, Phy Ed Activities & Materials	- 3
HNES 367, Prin of Conditioning	5 -
HD&E 320, Professional Issues	- 1
Humanities/Electives/Minor	- 9
Totals 1	5 16
Fourth Year	
EDUC 389 Native Americans & Multicult	-
EDUC 481 Class Practice Methods	, –
of Teaching PF K-12	
or reaching 11 18-12	, –

EDUC 485, Student Teaching Seminar	1
EDUC 486, Classroom Mgt of Diverse Learn . 2	-
EDUC 487, Student Teaching Elementary	6
EDUC 487, Student Teaching Secondary	6
HNES 461, Admin & Social Aspects of	
Phys Activ & Athletics (Capstone) 3	-
EDUC 451, Inst Plan, Methods, Assessment 3	-
Totals	13

Recommended Curriculum Physical Education Minor

	Credits
HPER 210, First Aid & CPR	2
HNES 253, Motor Learning & Performance or	
HNES 365, Kinesiology & Biocechanics	3
HNES 352, Phys Educ Activities & Materials	3
HNES 367, Prin of Conditioning or	
HNES 465 Physiology of Exercise	3

EDUC 481, Classroom Pract/Meth of Teaching K-12 . . 3

Select one of the following courses:

HNES 152, Prof Preparation in Middle School Act. ...3 HNES 153, Prof Preparation in High School Act.3

Physical Education: Non-Teaching Option

Students who wish to major in Physical Education and not become teachers may select the liberal arts program of the College of Human Development and Education. Concurrently with the major, the student will take a minimum of 58 general education credits including a foreign language (B.A. degree) or published minor (B.S. degree).

Recommended Curriculum Physical Education: Non-Teaching Option

First Year F	\$
BIOL 220, Human Anat & Physiology 3	-
BIOL 220L, Human Anat & Physiology I Lab 1	-
BIOL 221, Human Anat & Physiology II	3
BIOL 221L, Human Anat & Physiology II Lab	1
COMM 110, Public Speaking	3
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 152, Prof Prep in Middle School Act	3
HPER 217, Personal/Community Health	3
PSYC 111, Intro to Psychology	-
Totals	16
Second Year	
CSCI 116, Business Use of Computers or	2 (
CSCI 114, Microcomputer Packages	3-4
HNES 153, Prof Prep/in High School Act 3	-
HNES 154, Prof Prep/Elem School Act	3
HPER 210, First Aid & CPR	-
HNES 253, Motor Learning & Performance	3
SOC 110, Intro to Sociology	3
Quantitative Reasoning Elective	-
Humanities Elective	3
Electives	1
Totals 15	16-17
Third Year	
HNES 300, Curr, Standards & Assessment	
in PE	
HNES 350, Fitness Edu/Act/Mat	3
HNES 352, Phys Ed/Act/Mat	3
HNES 367, Prin of Conditioning	-
HD&E 320, Professional Issues	1
Electives	9
Totals	16

Fourth	Year
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Credits

HNES 461, Admin & Social Aspects of		
Phys Ed & Athletics	. 3	
Electives	12	14
Totals	15	14
Curriculum Total		122

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.

To earn a degree, each student must complete the core requirements listed, and then he/she may choose courses, which prepare for practice in either the public school setting or the community/work-site setting.

Credits

Recommended Curriculum Health Education Community Health Option

	0	com
First Year	F	5
HNES 110, Intro to HPER	l	
HNES 160, Found of Health Professions 2	2	
ENGL 110, College Composition I 3	3	
PSYC 111, Intro to Psychology	3	
HD&E 189, Skills for Academic Success 1	l	
BIOL 220, Human Anatomy & Phys I 3	3	
BIOL 220L, Human Anatomy & Phys I Lab 1	L	
HPER 217, Personal & Community Health	-	3
ENGL 120. College Composition II.	-	3
BIOL 221, Human Anatomy & Phys II	-	3
BIOL 221L, Human Anatomy & Phys II Lab	-	1
CSCI 114. Microcomputer Packages or		
CSCI 116. Business Use of Computers	-	3-4
COMM 110 Fund of Public Speaking -	-	3
Total	4 1	6-17
10141		.01/
Second Year		
Quantitative Reasoning (MATH)	3	
Elective	í	
SOC 110, Intro to Sociology	3	
PSYC 212, Psychological Aspects of Drug		
Use & Abuse	3	
CDFS 186, Consumer & Society	3	
HPER 210, First Aid & CPR	-	2
CDFS 135, Family Science	-	3
HNES 251, Nutrition, Growth,		
& Development	-	3
HNES 270, Consumer Issues in F&N	-	3
NUTR 240, Prin of Nutrition or		
HNES 250, Nutrition Science	-	3
Total	6	14
Third Year		
SOC 202, Minorities & Race Relations 3	3	
CDFS 230, Life Span Development	3	
HD&E 320, Professional Issues 1	l	
Elective	3	
Humanities & Fine Arts	3	
HNES 345, Materials & Concepts		
of Health Ed	3	
HNES 341, Psycho/Social Aspects of Health	-	3

HNES 445, Organ. & Admin of Coordinated	
Health Programs	3
HNES 452, Nutrition, Health & Aging	3
PSYC 210, Human Sexuality	3
Elective	3
Humanities & Fine Arts	3
Total	18
Fourth Year	
HNES 340, Community Health Nutrition 3	-
HNES 355, International Health	-
HNES 420, Needs Assess/Prog Plan/	
Health Ed	-
COMM 480, Health Communications 3	-
Elective	-
HNES 482, Community Health Internship	12
Total	12
Curriculum Total	122

Recommended Curriculum Health Education Teaching/School Health Option

First Year F	\$
HNES 110, Intro to HPER	-
HNES 160, Found of Health Professions 2	-
ENGL 110, College Composition I 3	
PSYC 111, Intro to Psychology	-
HD&E 189, Skills for Academic Success 1	
BIOL 220, Human Anat & Physiology I3	-
BIOL 220L, Human Anat & Physiology I Lab 1	-
HPER 217, Personal & Community Health	3
ENGL 120, College Composition II	3
BIOL 221, Human Anat & Physiology II	3
BIOL 221L Human Anat & Physiology II Lab	1
CSCI 114. Microcomputer Packages or	
CSCI 116. Business Use of Computers	3-4
COMM 110 Fund of Public Speaking -	3
Total 14	16-17
100001111111111111111111111111111111111	1017
Second Year	
Quantitative Reasoning	-
Elective	-
SOC 110, Intro to Sociology	
PSYC 212, Psychological Aspects of Drug	
Use & Abuse	-
NUTR 240, Prin of Nutrition or	
HNES 250 Nutrition Science	
Electives	5
HPER 210. First Aid & CPR	2
EDUC 300. Orientation to Elementary	
Teaching -	2
EDUC 321 Intro to Teaching -	- 3
PSVC 210 Human Sexuality -	3
Total	15
1000010101010101010101010101010101010101	
Third Year	
Admission to School of Education $\ldots\ldots X$	-
Humanities & Fine Arts	-
Elective	-
CDFS 135, Family Science	-
EDUC 322, Educational Psychology 3	-
EDUC 381, Early Experience1	-
HNES 345, Materials & Concepts of Health	
Educ	
HNES 341, Psycho/Social Aspects of Health	3
HNES 445, Org. & Admin of CSHP	3
Elective	3
Humanities & Fine Arts	3
EDUC 389. Native Amer/Multicultural Inst	-
Prac	3
CDFS 230. Life Span Development or	v
PSYC 250. Developmental Psychology	3
Total 16	18
	10
Fourth Year	
HNES 355, International Health 3	
HNES 420, Needs Assess & Prog Plan	
in Health Ed3	

EDUC 451, Instruc, Planning, Meth & EDUC 486 Classroom Mgt of Div Learners . . 2 EDUC 481, Classroom Prac/Meth HD&E 320, Professional Issues 1 EDUC 485, Student Teaching Seminar-EDUC 487, Student Teaching Capstone-Curriculum Total 122

Health Education Minor

Credits

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, and Physical Education. A minimum of 17 credits is required with the following curriculum:

Recreation Management Maior

The major in Recreation Management is a fouryear curriculum designed to prepare students for professional 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 course work in the Recreation Management curriculum includes 47 credits, 12 of which are taken during the senior year as an internship at an approved recreation agency. Students are advised to pursue supporting minors (e.g., Business Administration, Sociology, Gerontology, environmental studies, language) to enhance their career opportunities. Students may also seek appropriate professional certifications as a C.L.P. (Certified Leisure Professional), and/or R.S.S. (Recreational Sports Specialist) upon graduation.

Recommended Curriculum Recreation Management

	Credits
First Year	F S
COMM 110, Fund of Public Speaking	- 3
CSCI 114, Microcomputer Packages or	
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	l -
HPER 100, Concepts of Fitness/Activities2	2 -
HNES 110, Intro to HPER	l -
HNES 154, Prof Prep/Elem School Activity	- 3
HNES 196, Field Experience	l -
HPER 200, Intro to Parks and Recreation 2	2 -
Elective	3 2
Totals \ldots $\overline{1}$	3 14-15

Second Year

1

12

13

ART Series, Studio Art Elective	3	
HNES 196, Field Experience		1
HNES 225, Camp Mgt/Outdoor Rec S	Skills 2	
HNES 210, First Aid & CPR		2
Humanities & Fine Arts	3	
Science & Technology (one with lab)) 3,1	6
Social & Behav/Cultural Diversity		3
Electives	3	3
Totals	15	15
Third Year		
HNES 326, Recreation Prog	–	3

HNES 326, Recreation Prog	3
ГНЕА 161, Acting I 3	-
Humanities & Fine Arts	-
Quantitative Reasoning	3
Social/Behavioral Science	3
Electives	7
HNES 491, Seminar	1
Totals	17
Summer Session	
HNES 429, Recreation Internship (Capstone) -	12
Fourth Year	
HNES 426, Parks & Rec Admin	3
HNES 427, Leisure & Society	-
SOC 440, Sociology of Aging	
Electives	9
Fotals	12

School of Education

www.ndsu.edu/ndsu/scbool_of_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

Curriculum Total 122

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.
- Complete the following: 2.
- 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 three copies of portfolio reflections/ rationales (stated in EDUC 321).

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 2.50 shall increase their overall undergraduate grade-point average to 2.50 or achieve and maintain an average of 3.00 on postbaccalaureate 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) and EDUC 485.

Program Exit Requirements

- 1. Students must complete a portfolio developed throughout the professional education courses based on the Intrastate 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 ٠ minimum of 27 credits
- Students may complete an application for 3. 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 four basic parts: general education requirements, college requirements, professional education requirements, and teaching specialty requirements.

1. General Education

(minimum 36-37 credits)	Credits
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. College Requirement

HD&E 320, Professional Issues

3. Professional Education

The required common professional education sequence includes the following:

Additional credits are required for programs in Agricultural Education, English Education, Family and Consumer Sciences Education, Music Education, and Physical Education.

4. Teaching Specialty

See the School of Education for requirements for the following:

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 Vocational 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 gualified 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 Vocational Education for the preparation of family and consumer sciences teachers. Thus, graduates are qualified to teach family and consumer sciences classes in vocational or nonvocational 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.

Middle School Endorsement for Grades 5-8

Middle school endorsement is available on a voluntary basis for students who will receive teacher certification for grades K through 12. For students who will be certified for grades 7 through 12, but wish to qualify for teaching grades 5 and 6 in their subject fields, middle school endorsement will be mandatory. For more information contact the School of Education.

K-12 Certification/Licensure for Health Education, Physical Education, and Music Majors

Certification/licensure for kindergarten through 12th grade programs (K-12) is available for students majoring in Health Education, Physical Education, or Music Education. The student must enroll in EDUC 300, Orientation to Elementary Education, 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

A major in Elementary Education is available on the NDSU campus through a cooperative arrangement with Valley City State University, the degree-granting institution for this program.

Elementary Education/CDFS Dual Degrees

Students may concurrently earn a degree in Elementary Education from Valley City State University and a degree in Child Development and Family Science (Child Development option) from NDSU while located on the NDSU campus. It allows the student to earn two degrees from two universities in the timeframe it takes to usually 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.

	Credits
H&CE 341, Leadership & Presentation Technic	ques 3
H&CE 345, Extension Education	2
H&CE 444, Planning the Community	
Program in Ag Educ or	

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

- 1. Number of students in the regular teacher preparation program:
- a. Total number of students enrolled during 2002-2003: Full-time = 318; Part-time = 98

2. Information about supervised student teaching:

- Number of students in programs of supervised student teaching during academic year 2002-2003:78
- c. Number of supervising faculty who were: Appointedfull-timeinprofessionaleducation: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
- d. The student/faculty ratio was (divide the total given in B2. by the number given in B3.): 8/1
- e. 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.
- 3. Information about state approval or accreditation of teacher preparation programs:
- f. Is your teacher preparation program currently approved or accredited by the state? Yes
- g. 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), 600 E. Boulevard Ave, Dept 202, Bismarck, ND 58505-0080; phone (701)328-2264.

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

www.ndsu.edu/pbarmacy 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.

Degree Programs

The College of Pharmacy offers academic programs in pharmacy and nursing. 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.

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 as follows.

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 nonsuccessive semesters shall be terminated from enrollment in the College of Pharmacy.

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 impromptu essay written during the visit, 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 15 for the class beginning in the spring semester of the sophomore year. Applicants will receive notification of their status by July 15.

Department of Nursing

www.ndsu.edu/instruct/nysveen/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 consortium 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.

Philosophy. The philosophy of the nursing program embodies a set of beliefs that provide the context within which the mission is realized. These philosophical statements are articulated below.

Nursing is a discipline consisting of four pervasive concepts: person, environment, health, and nursing. As a discipline, nursing encompasses the components of nursing science, the art of nursing, personal knowledge, and ethics. The discipline continues to evolve from the interrelationships among nursing theory, research, and practice. This evolution involves an expanding body of nursing knowledge that blends with the arts, sciences, and humanities to form a framework for nursing practice.

The person, within the context of nursing is identified as a client; a client may be an individual, family, a group, and/or a community. We believe in the uniqueness and worth of our clients. This belief underlies our philosophies of nursing and education, and values both the commonalities and the diversities characteristic of people.

Environment is the client's circumstances and surroundings, both internal and external. These include physiological, psychological, cultural, spiritual, economic, a nd social influences, and the client's perception of these influences.We believe that clients, as individuals, families, groups, and/ or communities, are in constant interaction with their environments.

Health is maximized potential and well-being. The goal of nursing is to promote optimal health along the continuum of life and death.

The practice of nursing is a dynamic, deliberative and interpersonal process used to provide holistic care to clients. Nursing practice includes health promotion, risk reduction, and disease prevention as well as illness and disease management. This practice involves critical thinking within a deliberative decision-making framework. The practice of professional nursing is based on theory and research from nursing and other disciplines; practice, theory, and research are interrelated.

The nurse is prepared to perform multiple roles in diverse settings and is responsive to the changing health care needs of society. The nurse is accountable and responsible for actions taken within these roles.

Professional nursing education serves as a foundation upon which further learning is based. The baccalaureate degree is the entry-level to professional nursing practice. Baccalaureate nursing education prepares generalists and graduate nursing education prepares specialists for advanced practice. Professional nurses participate in activities that contribute to the ongoing development of the discipline.

Learning is a process evidenced by changes in cognitive, affective, and psychomotor behavior. Student learning is best facilitated in an environment of acceptance and freedom of expression that fosters critical thinking, self-understanding, caring, and creativity. Faculty provide opportunities for learning through experiences designed to integrate theory with practice, promote a spirit of inquiry, and provide opportunities for students to develop critical thinking abilities. Preparation of professional nurses is achieved through collaborative partnerships in which both the teacher and learner are actively involved and accountable.

Caring, integral to professional nursing practice, encompasses the nurse's empathy for and connection with the client. Caring is demonstrated in compassionate, sensitive, and appropriate nursing care that preserves human dignity and nurtures the human spirit.

Graduate Outcomes. The development of the outcomes was guided by "The Essentials of Baccalaureate Education for Professional Nursing Practice" (American Association of Colleges of Nursing, 1998), and the "Scope and Standards of Nursing Practice" (American Nurses Association, 2004). The graduates of the baccalaureate program:

- 1. Apply concepts from the arts, humanities, and sciences to professional nursing practice.
- 2. Communicate clearly and effectively.
- 3. Apply critical thinking in deliberative decision-making.
- 4. Provide nursing care in accordance with ANA, Standards of Clinical Nursing Practice.

Curriculum. The curriculum is organized according to a conceptual model that flows from the mission and philosophy of the nursing program and provides the core of the curricular content. The themes of the conceptual model can be identified within the objectives, content outlines, and

clinical experiences in each nursing course and within the graduate outcomes of the nursing program. 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 three 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 spring semester of the sophomore year.
- 2. For admission into the professional nursing program, an application must be submitted by June 15 to the Nursing Office, 136 Sudro Hall. Enrollment in the nursing major is limited. A minimum GPA of 2.8 (4.0 = A) is required in all post high school work.

Admission is competitive and based on all of the following: (a) Selective GPA of at least 2.8 that incorporates selected prerequisite courses (see recommended curriculum), (b) completion of prerequisite courses with a passing grade, (c) eligibility for sophomore standing, (d) 2 personal references, and (e) a personal interview if requested. Preference will be given to North Dakota residents and those students who have taken a greater number of credits in the North Dakota State University System.

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

The documents must be on file in the Nursing Office by June 15. 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 231-7395

Recommended Curriculum Nursing Major

	Credits
First Year 1	7 S
CHEM 117, Chem Concepts & Appl3	-
CHEM 117L, Chem Concepts & Appl Lab 1	
CHEM 260, Elements of Biochemistry	4
ENGL 110, College Composition I 3	
ENGL 120, College Composition II	3
MATH 104, Finite Mathematics	
MICR 202, Intro to Microbiology	2
MICR 202L, Intro to Microbiology Lab	1
PSYC 111, Intro to Psychology	3
SOC 110, Intro to Sociology or	
ANTH 111, Intro to Anthropology 3	
UNIV 189, Skills for Academic Success 1	
Humanities and Fine Arts Electives	3

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
COMM 110, Fund of Public Speaking 3	
NUTR 240, Prin of Nutrition or	
F&N 250, Nutrition Science	3
NURS 351, Nursing Concepts ¹	4
NURS 360, Health Assessment	4
PSYC 250, Developmental Psychology or	
CDFS 230, Life Span Development3	
Cultural Diversity Elective	3
Humanities & Fine Arts Elective	
Totals	18

 Must be accepted into nursing program to enroll in nursing courses.

Third Year

NURS 341, Client Concepts 4	
NURS 342, Adult Health Nursing I 4	
NURS 352, Family Nursing I	4
NURS 362, Family Nursing II	4
NURS 420, Nursing Research	2
PHRM 300, Prin of Clinical Pharmacology 3	
Global Perspectives	
Free Electives	6
Totals	16

Fourth Year

NURS 401, Community Health 4	-
NURS 402, Mental Health Nursing 4	
NURS 403, Adult Health Nursing II 4	
NURS 404, Adult Health Nursing III	4
NURS 411, 412, Role Development I, II	2,2
NURS 430, Nursing Management	2
Free Electives	3
Totals	13
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.

ENGL 110, College Composition I

ENGL 120, College Composition II

MATH 104, Finite Mathematics

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 Microbiology & Lab or

MICR 202 & 202L, Intro to Microbiology & Lab BIOL 220 & 220L, Human Anat & Physiology I & Lab BIOL 221 & 221L, Human Anat and Physiology 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 for free electives that may enhance their program of study.

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/pbarmacy

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, wholesale, and industrial pharmacy. Other potential opportunities include positions in food and drug inspection and analysis for both the state and federal governments, medical service representatives, and laboratory and 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 American Council on Pharmaceutical Education (ACPE).

Recommended Curriculum 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:

	Credits
First Year F	' s
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	5 16
Second Year	
MICR 202, 202L, Intro 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 Electives3	
Totals \ldots $\overline{17}$	/ 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.

Recommended Curriculum Professional Pharm.D. Major

	C 111-
PI-rau	Creaus
BIOC 460, Biochemistry 1	4
MICR 4/0, Basic Immunology	
PSCI 340, Patnophysiology 1	4
PSCI 368, Pharmaceutics 1	4
PHRM 351, Pharmaceutical Care I	
lotals	17
P1- Spring	
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	
Fall/Spring Total	33
P2. Fall	
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	
Total	17
P2- Spring	
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	
Fall/Spring Total	34

P3- Fall

- 5 - 111
PHRM 472, Pharmacy Law
PHRM 520, Pediatrics-Geriatrics2
PHRM 532, Infectious Disease
PHRM 538, Cardiovascular & Pulmonary4
PHRM 551, Pharmaceutical Care2
PHRM 558, GI/Nutrition
Free Elective
Total
P3. Storing
PHRM 534 Rheum/Endo/Repro 2
PHPM 535 Hematology/Oncology 2
PHPM 536 Neurology/Discology 2
DHDM 527 Depa1/Eluid & Electrolyte 2
DIDM 552 Dharma contical Caro
First Flasting
Field 14/15
Fau/spring 10tal
P4- Fall/Spring
45-Week Experiential Training Program ^{1,2}
PHRM 581, Clin Clerkship I
PHRM 582, Clin Clerkship II
PHRM 583, Clin Clerkship III
Fall/Spring Total
Curriculum Totals
¹ Students assigned by rotation.

² Sites located in Fargo and other areas.

College of Science and Mathematics

www.ndsu.edu/scimath Stevens Hall 201 (701) 231-7411 Alan R. White, 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 othetr 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.

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 Clinical Laboratory Science Computer Science Geology Mathematics Natural Resources Management Physics Psychology Radiologic Sciences **Respiratory Care** 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 099 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 are also 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

	Credits
COMM 110, Fund of Public Speaking	3
ENGL 110, 120, College Composition I, II	6
UNIV 189, Skills for Academic Success	1
Humanities & Fine Arts ¹	6
Humanities & Social Sciences	
(additional college requirement) ¹	6
Quantitative Reasoning ¹	3
Science & Technology ¹	10
Social & Behavioral Sciences ¹	6
Wellness ¹	2
1 Refer to unundry edu/registrar for courses	approved

for General Education listed in the Appendix.

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 collegelevel 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 preprofessional 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.

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., 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, 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

	Credits
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	

* Approximate number of credits in this subject area

Interdisciplinary **Programs**

Biotechnology Major

www.ndsu.edu/ndsu/academic/factsbeets/ ag/biotech.shtml

This multidisciplinary program is offered in either the College of Science and Mathematics or the College of Agriculture, Food Systems, and Natural Resources and leads to the Bachelor of Science degree. Faculty in each of the cooperating life-science departments has been identified to serve as advisors for students who select the Biotechnology major.

Biotechnology Minor

A minor in Biotechnology is also offered. For the program description, refer to the appropriate listing in The College of Agriculture, Food Systems, and Natural Resources section.

Natural Resources Management Major

www.ag.ndsu.nodak.edu/nrm

This multidisciplinary program is available through the College of Science and Mathematics' Biological Sciences and Geosciences departments. For the program description, refer to the appropriate listing in The College of Agriculture, Food Systems, and Natural Resources section.

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 BIOC 260 or 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.

Credits

Recommended Curriculum Biological Sciences Major

First Year F	\$
BIOL 150, 150L, 151, 151L,	
General Biology I, II, Labs	3,1
CHEM 121, 121L, 122, 122L,	
General Chemistry I, II, Labs	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
Second Year	
BIOL 364, General Ecology	3
BOT 315, 315L Genetics. Lab	
CHEM 341, 341L, 342, Organic	
Chemistry I. II. Lab	3
COMM 110, Fund of Public Speaking	3
STAT 330, Intro Statistics	3
BOT 372, Struct & Diversity Plants & Fungi 4	_
Social Science	3
Totals	15
Third Year	
BIOC 460, Elements of Biochem4	
PHYS 211, 211L, 212, 212L,	
College Physics I, II & Labs 4	4
ZOO 370, Cell Biology	3
Biological Science	3
Earth Science	3
Humanities & Fine Arts	3
Totals	16
Fourth Year	
BIOL 459, Evolution	3
BIOL 491, Senior Seminar	2
Biological Sciences	6
Humanities & Fine Arts	
Humanities or Social Sciences Electives3	3
Electives	
Totals	14
Curriculum Total	. 122

Recommended Curriculum Environmental Science Option

	Credits
First Year 1	
BIOL 150, 150L, 151, 151L,	
General Biology I, II, Labs	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	5 15
Second Year	
BIOL 315, 315L, Genetics, Lab	3.1
BOT 372, Struct & Diversity 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.	5,-
College Physics I. II. Labs	1 3.1
Totals	5 15
Third Year	
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	18 15
	10 19
Fourth Year	
BIOC 460, Biochemistry 4	-
BIOL 459, Evolution	3
BIOL 491, Seminar	2
SOIL 410, Soil & the Environment	2
Biological Sciences	3
General Education	3
Wellness	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 Curriculum Biological Sciences Education Major

0	credits
First Year F	5
BIOL 150, 150L, 151, 151L,	
General Biology I, II, Labs	3,1
CHEM 121, 121L, 122, 122L,	
General Chemistry I, II, Labs	3,1
ENGL 110, 120, College Composition I, II 3	3
HD&E 120, Orientation to HD&E1	-
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
Second Year	
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	
EDUC 322, Educational Psychology	3
EDUC 381, Early Experience1	-
PHYS 211, 211L, 212, 212L,	
College Physics I, II, Labs	3,1
Wellness Elective	2
Humanities or Social/Behavioral Science	3
Totals	20

Third Year

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	-
BIOL 220, 220L, Anatomy/Physiology, Lab 3,1	
BIOL 221, 221L, Anatomy/Physiology Lab	3,1
ZOO 370, Cell Biology	3
Social & Behavioral Sciences	-
Totals	20
Fourth Year	
BIOL 491, Seminar 2	
EDUC 481, Classroom Pract/Sci Methods 3	

EDUC 486, Classroom Management 3	-
EDUC 487, Student Teaching	12
Biology Electives6	-
Humanities & Fine Arts	-
Humanities or Social/Behavioral Sciences 3	
Totals	13
Curriculum Total	141

Recommended Curriculum Comprehensive Science Education Major

	Credits
First Year F	\$
BIOL 124, 124L, Environmental Science, 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&E1	-
HD&E 189, Skills for Academic Success 1	-
Humanities & Fine Arts	3
Social & Behavioral Sciences	3
Wellness	-
Totals	17
Second Year	
BIOL 150, 150L, 151, 151L,	
General Biology I, II, Labs	3,1
CHEM 341, 341L, 342, 342L,	

Organic Chemistry I, II, Labs 3,1

3.1

EDUC 321 Intro to Teaching	
EDUC 322, Educational Psychology	3
MATH 165, 166, Calculus I, II	4
Wellness Elective	2
EDUC 381, Early Experience	
Totals 16	17
Third Year	
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	4,1
BOT 372, Struct & Diversity Plants & Fungi 4	
BIOL, BOT, or ZOO Elective (300+ level)3	-
STAT 330, Intro Statistics	3
Computer Science	-
Totals	18
Fourth Year	
EDUC 481, Classroom Pract/Sci Methods3	
EDUC 485, Student Teaching Seminar	1
EDUC 486, Classroom Management 3	
EDUC 487, Student Teaching	12

EDUC 487, student reaching	12
PHYS 110, Intro Astronomy	
BIOL, BOT, or ZOO Elective (300+ level)3	
Humanities & Fine Arts	
Social & Behavioral Sciences	-
Totals	13
Curriculum Total	135

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:

DIOL 150/150L, 151/151L, 515/515L, 459
BOT 314, 372, 380, 452, 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 Curriculum Botany Major

(Credits
First Year F	\$
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
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	15-17
Second Year	

BOT 315, 315L, Genetics, Lab 3,1 BOT 314, Systematic Botany. 3

CHEM 341, 341L, 342, Organic	
Chemistry I, II, Lab	3
PHYS 211, 211L, College Physics I, Lab 3,1	
PHYS 212, 212L, College Physics II, Lab	3,1
BOT 372, Struct & Div/Plants & Fungi 4	
Humanities & Fine Arts	
Social & Behavioral Sciences	3
Totals	17
Third Year	
BIOC 460, Elements of Biochemistry 4	-
BOT 380, 380L, Plant Physiology/lab 3,1	
BOT 452, Plant Structure	-
COMM 110, Fund of Public Speaking 3	-
STAT 330, Intro Statistics	3
Botany Electives	6
Humanities & Fine Arts	3
Social & Behavioral Sciences	3
Totals	15
Fourth Year	
BIOL 459, Evolution	3
BOT 460, Plant Ecology	-
BOT 471 or 472, Phycology, Lichenology3	-
BOT 491, Seminar	2
MICR 350, 350L, General Microbiology,	
Lab	
ZOO 370, Cell Biology	3
Humanities & Fine Arts	3
Social & Behav Science	-
Electives	3
Totals	14
Curriculum Total	. 122

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 Curriculum Clinical Laboratory Science Major

0	redit
First Year F	5
BIOL 150, 150L, General Biology, Lab 3,1	
CHEM 121, 122, General Chemistry I, II3	3
CHEM 121L, 122L, General Chemistry Labs 1	1
CLS 111, Intro to Clinic Lab Science1	-
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 Success1	-
Wellness	2
Totals	15
Second Year	
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 ¹ , Survey/Organic Chemistry or 3	-
CHEM 341, Organic Chemistry I 3	
CHEM 341L, Organic Chemistry I Lab 1	
CHEM 342, Organic Chemistry II	3
MICR 350, General Microbiology	
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	-
Totals	16
Third Year	
BIOC 460, Found of Biochemistry 4	-
BIOL 435, Hematology	2
MICR 363, Clinical Parasitology	2
MICR 470, 471, Immunology, Lab 3,2	
STAT 330. Intro Statistics	3

 General Education
 6
 6

 Totals
 15
 13

 Fourth Year
 15
 15

 CLS 496 Field Experience
 15
 15

 Credits earned at an accredited school of clinical laboratory science
 122

¹ Students cboosing to fulfill the organic chemistry requirement with CHEM 240 must also complete BIOC 461, Foundations of Biochemistry and Molecular Biology II, 4 credits.

Radiologic Science 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. 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 inpatient 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 Curriculum Radiologic Sciences Major¹

	•	Credits
First Year	F	\$
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 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 Psychology	. 3	
General Education		3
Wellness	. 2	
Totals	17	16
Second Year	-	
COMM 110, Fund Public Speaking	. 3	
CHEM 117, 117L, Chemistry Concept,		
Lab ²	3,1	
CHEM 260, Elem of Biochemistry ²		4
PHYS 211, 212, College Physics I, II	. 3	3
PHYS 211L, 212L, College Physics Labs	. 1	1
General Education	. 3	6
STAT 330, Intro Statistics		3
VETS 115, Med Term for the Para	. 1	
PHRM 300, Prin Clinic Pharmacy	. 3	
Totals	18	17
Third Year F	\$	Sr
General Education Elective	3	
Specialty Option Elective	3	
RS 496, Internship ³ 12	12	6
Totals	18	6
Fourth Year		
Specialty Option Elective	6	
RS 496, Internship ³ 12	12	6
Totals	18	6
Curriculum Total		. 146

¹ This is a sample curriculum. Other variations are possible. Students should meet with their RS advisor to plan schedules.

- ² 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.
- 3 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 Curriculum Respiratory Care Major

	Credits
First Year	F S
CHEM 121, 121L, General Chemistry I, Lab 4	í –
CHEM 122, 122L, General Chemistry II, Lab	- 4
CSCI 114, Microcomputer Packages	, –
ENGL 110, 120, College Composition I, II 3	5 3
MATH 103, College Algebra 3	, –
MICR 202, 202L, Intro Micro, Lab	- 3
RC 111, Intro to Respiratory Care 1	-
SOC 110, Intro to Sociology	- 3
UNIV 189, Skills for Academic Success 1	-
Wellness course	- 2
Totals	5 15
Second Year	
BIOL 220, 220L, Human/Anat/Physics I/Lab 4	é –
BIOL 221, 221L, Human/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	2 –
PHYS 120, Fund of Physics	- 3
PSYC 111, Intro to Psychology	, –
STAT 330, Intro Statistics	- 3
Humanities & Fine Arts Elective	- 3
Totals	5 17

Third Year

Summer Session
RC 496, Internship (12 months
including summer session) ¹
Totals

Fourth Year

RC 494, Individual Study	
Humanities & Fine Arts Elective	

. 40

-3

pecial Electives ² 6	6
General Education Requirements	3
Totals	12
Curriculum Total	127

¹ Credits earned at MeritCare Medical Center Respiratory Care Program.

² Each student will develop a specialty proposal in bis/ber 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 bigher. 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.

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:

- BIOL 150-150L, General Biology I, Lab
- BIOL 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 Curriculum Option 1: General Zoology Major

Ci	redits
First Year F	5
BIOL 150, 150L, 151, 151L	
General Biology I. II. Labs	3.1
CHEM 121, 121L, 122, 122L	5,-
General Chemistry L II Labs 3.1	31
COMM 110 Fund of Public Speaking	3
FNGL 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
10(a)5 10	10
Second Year	
BIOL 364, General Ecology or	
ZOO 360, Animal Behavior	3
BOT 372, Struct&Diversity/Plants&Fungi 4	
CHEM 341, 341L, Organic Chemistry I,	
Lab	
STAT 330, Intro Statistics	3
ZOO 315, 315L, Genetics, Lab	
ZOO 280, Comp Chor Morph or	
ZOO 482, Developmental Biology 3-4	
General Education Requirements.	6
Totals	12
177. Jun J. X7	
Ibira Year	
PHYS 120, Fund of Physics	-
ZOO 370, Cell Biology or	
ZOO 380, Vert Histology	or 3
ZOO 450, Invertebrate Zoology	4
ZOO 460, Anat Phys or	
ZOO 462, Physiol Ecology 3	or 4
Zoology Electives	3-4
Electives	3-6
Totals 12-15	14-17
Fourth Year	
ZOO 491, Seminar	or 2
Biodiversity Elective	or 3
Zoology Electives	3-4
Electives	8-12
Totals	16
Curriculum Total	. 122

Recommended 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. For clinical laboratory science and respiratory care, see individual programs listed in this same section.

C	redits
First Year F	\$
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
COMM 110, Fund of Public Speaking	3
ENGL 110, 120, College Composition I, II 3	3
MATH 146, Applied Calculus I	-
UNIV 189, Skills for Academic Success 1	-
Wellness	2
Totals	16
Second Year	
BIOL 364, Gen Ecology or	
ZOO 360, Animal Behavior	3
CHEM 341, 341L, Organic Chemistry I,	
Lab	
CHEM 342, 342L, Organic Chemistry 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	2-3
Totals	16-17

Third Year

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	4
General Education Requirements 6	3
Zoology Elective	-
Totals	14

Fourth Year

ZOO 462 Physiol Ecology or

, , , , , , , , , , , , , , , , , , , ,	
ZOO 464, Endocrinology	
ZOO 491, Seminar	or 2
Biodiversity Elective	or 3
Cell Biology Elective	
Zoology Elective	3-4
Electives	6-12
Totals	15
Curriculum Total	122

Recommended 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. Field experience may be gained either at a biological field station or through employment approved by the advisor.

	Credits	
First Year	F S	
BIOL 150, 150L, 151, 1511,		
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 3	
MATH 146, Applied Calculus I	í –	
UNIV 189, Skills for Academic Success1	l	
Wellness	- 2	
Totals \ldots $\overline{1}$	6 16	

Second Year

BIOL 364, General Ecology
BOT 372, Struct & Diversity Plants & Fungi . 4
CHEM 240, Survey Organic Chemistry 3
CSCI 114, Microcomputer Packages
STAT 330, Intro Statistics
ZOO 280, Comp Chor Morph
ZOO 315, 315L, Genetics, Lab
General Education Requirements
Totals

3

3

3

 $\overline{4}$

16

Ibird Year	
BOT 314, Systemic Botany ¹	3
PHYS 120, Fund of Physics	
ZOO 462, Physiol Ecology	-
Biodiversity Elective	or 3-4
General Education Requirements 5	6
Management Elective	6
Totals	18-19
Fourth Year	
ZOO 491, Seminar	2
Biodiversity Elective	or 3-4
Botany Elective ¹ 3	or 3
Ecology/Behavior Elective	or 3
Management Elective	or 3
Zoology Electives	or 3-4

17

¹ Strongly recommended, but not required.

Concept Categories	Option 1	Option 2	Option 3
Biodiversity (ZOO 450,			
452, 454, 456, 458)	x	х	x
Cell biology (MICR 350-350	L;		
ZOO 370, 380)	x	х	
Ecology/behavior (BIOL 364	í;		
ZOO 360, 470)	x	х	х
Management (ZOO 472, 474	í,		
475, 476, 477)			х
Morphology (ZOO 280, 482)x	х	х
Physiology (ZOO 460, 462,			
464)	X	х	х

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

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.

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.

Recommended Curriculum B.S. in Biochemistry and Molecular Biology Major

	Crei	uis
First Year	F	\$
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 or	3	3
CHEM 121, 122, Gen Chemistry I, II	3	3
CHEM 160, 161, Prin of Chemistry Labs or	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

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Recommended Curriculum Biochemistry Option

Second Year

Second Ical	
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	
PHYS 251, 252, Univ Physics I, II 4	4
PHYS 251L, 252L, Univ PhysicsLabs 1	1
Behavioral, Soc Sci, Humanities	3
Totals	15
Third Year	
BIOC 460, 461, Biochem/Mol Biology4	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
BIOC 475, Computer Applic in BMB	3
Behavioral, Soc Sci, Humanities	3
Wellness	2
Totals	16
Fourth Year	
BIOC 473, Meth Biochem Research 4	
BIOC 465, Phys, Chem, Biophysics 4	
BIOC 485, Industr Biotech	3
BIOC 483, Cell Sig Transd Metabl	
BIOC 494, Research	2
BIOC 491, Senior Seminar:	
Modern Concepts in BMB	2
BMB Area of Specialization	3
Behavioral, Soc Sci, Humanities	6
Totals	16

Curriculum Total 125

Additional required courses:

Plus six credits in other upper division science courses.

Recommended Curriculum Molecular Biology Option

	Second	Year
--	--------	------

Second Year	
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	-
PHYS 251, 252, Univ Physics I, II or	4
PHYS 211, 212, Col Physics I, II 3	3
PHYS 251L, 252L, Univ Physics Labs or 1	1
PHYS 211L, 212L, Col Physics Labs 1	1
Behavioral, Soc Sci, Humanities	3
Totals	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
Behavioral, Soc Sci, Humanities	3
Wellness	2
Totals	16

Fourth Year

Tourns Teur	
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	-
BIOC 494, Research	2
BIOC 491, Senior Seminar:	
Modern Concepts in BMB	2
BMB Area of Specialization	6
Behavioral, Soc Sci, Humanities	6
Totals	16
Curriculum Total	8-126

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 Curriculum Bioinformatics Option

Second Year
CHEM 341, 342, Organic Chemistry I, II3
CHEM 341L, 342L, Organic Chemistry Labs 1
COMM 110, Fund of Public Speaking
CSCI 160, 161, Computer Sci I, II 4
ZOO 315, Genetics
PHYS 251, 252, Univ Physics I, II 4
PHYS 251L, 252L, Univ Phys Labs 1
Behavioral, Soc Sci, Humanities3
Totals
Third Year
<i>Third Year</i> BIOC 460, 461, Biochem/Mol Biology4
<i>Third Year</i> BIOC 460, 461, Biochem/Mol Biology 4 CHEM 431, 431L, Analyt Chemistry I, Lab 3,2
Third Year BIOC 460, 461, Biochem/Mol Biology HEM 431, 431L, Analyt Chemistry I, Lab. BIOC 491, Seminar
Third Year BIOC 460, 461, Biochem/Mol Biology 4 CHEM 431, 431L, Analyt Chemistry I, Lab. 3,2 BIOC 491, Seminar - MICR 350, 350L, Gen Microbiology 3,1
Third Year BIOC 460, 461, Biochem/Mol Biology 4 CHEM 431, 431L, Analyt Chemistry I, Lab. 3,2 BIOC 491, Seminar - MICR 350, 350L, Gen Microbiology 3,1 BIOC 474, Meth Recomb DNA Tech -
Third Year BIOC 460, 461, Biochem/Mol Biology 4 CHEM 431, 431L, Analyt Chemistry I, Lab. 3,2 BIOC 491, Seminar - MICR 350, 350L, Gen Microbiology 3,1 BIOC 474, Meth Recomb DNA Tech - BIOC 475, Computer Applic in BMB -
Third Year BIOC 460, 461, Biochem/Mol Biology 4 CHEM 431, 431L, Analyt Chemistry I, Lab. 3,2 BIOC 491, Seminar - MICR 350, 350L, Gen Microbiology 3,1 BIOC 474, Meth Recomb DNA Tech - BIOC 475, Computer Applic in BMB - CSCI 372, Comparative Languages 3
Third Year BIOC 460, 461, Biochem/Mol Biology 4 CHEM 431, 431L, Analyt Chemistry I, Lab 3,2 BIOC 491, Seminar

Fourth Year

Credits

BIOC 473, Meth Biochem Research 4	-
BIOC 465, Phys, Chem, Biophysics 4	-
BIOC 485, Industr Biotech	3
BIOC 494, Research	2
BIOC 491, Senior Seminar:	
Modern Concepts in BMB 1	1
BMB area of specialization	-
Behavioral, Soc Sci, Humanities 3	6
Totals	15
Curriculum Total	133

Additional required courses:

Plus	nine	credits	in	other	upper	division	comput
er so	cience	e course	es:				

- Recommended courses include: CSCI 212. Self-Paced C++, 1 cr.;
- CSCI 315, Syst. Analy. & Design, 3 cr.; CSCI 373, Assembly Prog., 3 cr.;

CSCI 374, Comp. Org. & Arch., 3 cr.; and CSCI 458, Microcomp. Graphics, 3 cr.

Credits

Recommended Curriculum Biophysics Option

Second Year

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	-
MATH 266, Differential Equat	3
ZOO 315, Genetics	-
PHYS 251, 252, Univ Physics I, II 4	4
PHYS 251L, 252L, Univ Physics Labs1	1
Behavioral, Soc Sci, Humanities	3
Totals	19

Third Year

BIOC 460, 461, Biochem/Mol Biology4	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
Wellness	2
Totals \ldots $\overline{16}$	16

Fourth Year

Credits

3

1

3

4

4

1

3

19

4

1

3

3

_

3

2

16

BIOC 473, Meth Biochem Research 4	-
CHEM 364, 365, Phys Chemistry I, II 4	$\overline{4}$
BIOC 494, Research	2
BIOC 491, Senior Seminar:	
Modern Concepts in BMB 1	1
BMB Area of Specialization6	6
Behavioral, Soc Sci, Humanities	6
Totals	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 Curriculum Biochemical Business Option

Credits Second Year COMM 110, Fund of Public Speaking. -3 CHEM 341, 342, Organic Chemistry I, II. 3 3 CHEM 341L, 342L, Organic Chemistry Labs . . 1 1 ---PHYS 251, 252, Univ Physics I, II 4 or 4 _ 3) PHYS 251L, 252L, Univ Phys Labs or1 1 PHYS 211L, 212L, Col Phys Labs1 1) ___ ECON 202, Prin of Macroecon -3 15 Third Year BIOC 460, 461, Biochem/Mol Biology 4 4 CHEM 431, 431L, Analyt Chemistry I, Lab. . . 3,2 1 BIOC 491 Seminar-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 2 16 Fourth Year BIOC 473, Meth Biochem Research 4

Curriculum Total	.123-125
Totals	7 15
Behavioral, Soc Sci, Humanities	- 6
BMB Area of Specialization	5 3
Modern Concepts in BMB	1 1
BIOC 491, Senior Seminar:	
BIOC 494, Research	2 2
BIOC 485, Industrial Biotech	- 3
BIOC 465, Phys, Chem, Biophysics 4	í –

Additional required courses:

Plus nine credits in 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.

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 Curriculum Chemistry Major

	Credits	;
First Year	F 5	3
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 ¹	3 -	
Wellness	- 2	
Totals	15 10	5
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 ²	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 ¹	- 3	
Totals	13 10	6

Third Year

CHEM 431, 431L, Anal 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 ¹	9
Totals	16

Fourth Year

BIOC 460, Found/Biochem/Molec Biology 4	-
CHEM 425, 429, Inorganic Chemistry, Lab 3,2	
CHEM 432, 432L, Anal Chemistry II, Lab	3,1
CHEM 491, Seminar in Chemistry	2
General Education ¹	9
Totals	15
Curriculum Total	122

¹ 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.

² MATH 265 may be substituted for MATH 259.

Recommended Curriculum Biochemistry Option

The curriculum for the biochemistry option is derived from the ACS certified chemistry major. The following arrangement of courses is presented as a model and may be restructured to meet individual needs

	Credits
First Year	F S
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	6 18
Second Year	
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 ¹	3
Wellness	
Totals	16
Third Year	

BIOC 460, 461, Biochem/Mol Biology I, II 4	4
CHEM 431, 431L, Analytical Chemistry I,	
Lab	
CHEM 380, Seminar	1
CHEM 364, 365, Phys Chemistry I, II 4	4
CHEM 471, Phys Chemistry Lab	2
MICR 350, 350L, Gen Micro, Lab	
General Education ¹	6
Totals	17
Fourth Year	
BIOC 473, Meth Biochem Res	-
BIOC 474, Meth Recomb DNA Tech	3
CHEM 425, 429, Inorganic Chemistry, Lab 3,2	
CHEM 491, Senior Seminar	2
Biological Sci. Electives ²	3
General Education ¹ 3	6
Totals	14
Curriculum Total	. 127

¹ General education credits must be selected from approved courses and include 18 credits in bumanities 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.

² Biological Science electives include: BIOL 315/315L, BIOL 364, BOT 380, ZOO 370 and MICR 352.

Recommended 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
First Year	F S
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 ¹	3 -
Wellness	- 2
Totals	15 16
0 I.V.	
Second Year	
CHEM 341, 342, Organic Chemistry I, II	3 3
CHEM 353, 354, Majors' Org Chemistry 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 ¹	- 3
Totals	13 16
Third Year	
CHEM 364, 365, Physical Chemistry I, II,	4 4
CHEM 380. Chemistry Junior Seminar	- 1
CHEM 431, 431L Analy Chemistry I. Lab 4	í.1 -
CHEM 471. Physical Chemistry Lab	- 2
P&C 474 475 Coatings I II	3 3
P&C 484 485 Coatings I II Jabs	2 2

General Education ¹	3
Totals	15
Fourth Year	
BIOC 460, Found/Biochem/Molec Biology 4	
CHEM 425, 429, Inorg Chemistry, Lab 4,1	
CHEM 432, 432L, Analy Chemistry II, Lab	3,1
CHEM 491, Chemistry Senior Seminar	2
P&C 473, Polymer Synthesis	
General Education ¹	9
Totals	15
Curriculum Total	122

¹ 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 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 425, 429, 471, and either BIOC 461 or CHEM 432/432L as electives.

	Credits
First Year F	5
BIOL 150, 150L, General Biology I, Lab 3,1	i
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
UNIV 189, Skills for Academic Success1	-
Totals $\overline{16}$	18
Second Year	
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 Algebra1	
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 ¹	3
Wellness	
Totals	16
Third Year CHEM 364, 365, Physical Chemistry I, II. CHEM 380, Chemistry Junior Seminar CHEM 431, 431L, Analy Chemistry I, Lab MICR 350, 350L, Microbiology I & Lab General Education ¹ Totals	4 1
Fourth Year	
CHEM 425. Inorganic Chemistry	-
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 2201 2211 Anat/Phys Labs	1
General Education ¹	6
Flectives 3	3
Totals 14	15
Curriculum Total	122
¹ General education credits must be selected j proved courses and include 18 credits in bu and social sciences; six of these must be in bu	from ap- manities manities

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 Curriculum Chemistry Education Option

This option is designed for the student interested in a disciplinary major in chemistry, but who is also 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
First Year F	s - 1
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
BIOL 150, 150L, General Biology I/Lab 3,1	l
UNIV 189, Skills for Academic Success1	-
General Education ¹	3
Totals \ldots $\overline{16}$	5 17
Second Year	
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 ¹	3
Wellness	-
Totals	16
Third Voar	
CHEM 36/ 365 Physical Chemistry I II /	4
CHEM 380 Chemistry Junior Seminar	1
CHEM (31 /311 Analytical Chemistry I	1
Lab	l –
EDUC 321, Intro to Teaching3	-
EDUC 322, Educational Psych	3
EDUC 381, Early Experience	1
General Education ¹	6
Physics Elective	-
Totals	5 15
Found Voge	
FOURID TEAR	
biou 400, round/biocnem/molec Biology 1.4	-
CHEMI 425, INOIGANIC CHEMISTRY	

BIOC 460, Found/Biochem/Molec Biology I . 4	
CHEM 425, Inorganic Chemistry3	-
CHEM 491, Chemistry Senior Seminar	2
General Education ¹	6
Electives ² 4	6
Totals	14
Curriculum Total	122

- ¹ General education credits must be selected from approved courses and include 18 credits in bumanities and social sciences; six of these must be in bumanities and fine arts and six in social/bebavioral sciences.Also, three credits must be from the global perspectives category and three from cultural diversity:
- ² 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

www.ndsu.edu/ndsu/polymers_coatings 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.

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). Refer to the Coatings and Polymeric Materials Option in Chemistry or the P&C Option in Mechanical Engineering. Individual programs for majors in other disciplines have been worked out.

The Coatings And Polymeric Materials Option 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 (P&C 474, 475) and laboratory sequence (P&C 484, 485 for Chemistry majors) (P&C 484 for ME majors) can be taken during the same academic year. Chemistry majors with the Polymers and Coatings Option are also required to take polymer synthesis (P&C 473) prior to graduation.

Coatings and Polymeric Materials offers graduate level programs leading to the M.S. and Ph.D. degrees in Coatings and Polymeric Materials.

Department of Computer Science

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 are also 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 graduatecourses,studentsareofferedanopportunity 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.

Recommended Curriculum Computer Science Major

	Credits
First Year I	7 S
CSCI 160, 161, Comp Sci I, II	4
ENGL 110, 120, College Composition I, II 3	3
MATH 165, 166, Calculus I, II	4
UNIV 189, Skills for Academic Success 1	-
Humanities, Soc Sci Electives 6	6
Totals	3 17
Second Year	
COMM 110, Fund of Public Speaking	3
CSCI 222, Discrete Math	-
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	1 3,1
Wellness 2	-
Totals	3 16
Third Year	
CSCI 366, 372, File/Data Sys, Comp Lang 3	3
CSCI 467, Algorithm Analysis	3
Comp Sci Elective	-
Humanities/Soc Sci Elective	-
Science Electives	3
Free Electives	6
Totals	5 15
Fourth Year	
CSCI 474, Op Systems	-
CSCI 475, Op Systems II or	
CSCI 468, Database Mgmt	3
CSCI 489, Soc Implications	3
Comp Sci Electives	3
Free Electives	6
Totals	5 15
Curriculum Total	129

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).

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

Geology and Geography are the sciences of the Earth, its environments, peoples, and cultures.

Geography Minor

The 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, computer mapping, and other computer applications).

The Geography program does not offer a major. However, a minor is offered, and may be taken in conjunction with a variety of majors such as social science and secondary education. The minor consists of 18 credits in geography selected in consultation with the geography advisor. Students preparing for teaching geography in the secondary schools should follow the School of Education curriculum.

Geology Major

The Geology major is an interdisciplinary curriculum in which knowledge from chemistry, physics, mathematics, soil science, and engineering is applied to obtain a better understanding of the Earth's environment. This is an excellent major to follow for a career in the environmental sciences. Completion of an undergraduate geology major leads to a variety of career opportunities in industry, government, teaching, or to continuing studies in graduate research. Typical professional careers are involved with the development, management, or regulation of the Earth's resources. Curriculum requirements include a departmental core of 46 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.

To meet requirements of the "No Child Left Behind" Act 2001, 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 Curriculum Geology Core Requirements¹ Geosciences and Soil Science Courses²

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

GEOL 412, Geomorphology
GEOL 420, 421, Mineralogy, Lab
GEOL 422, 423, Petrology/Petrography6
GEOL 450, Field Geology ³
GEOL 455, Intro Geographic Info Systems3
GEOL 491, Seminar
SOIL 444, Soil Genesis & Survey
Total \ldots $\overline{47}$

Chemistry Courses

CHEM 121, 121L, General Chemistry I, Lab or
CHEM 150, 160, Prin Chemistry, Lab ⁴ 4
CHEM 122, 122L, General II, Chemistry, Lab or
CHEM 151, 161, Prin Chemistry, Lab
Total

Mathematics Courses

MATH 103, 105, College Algebra, Trig ⁵ 6
MATH 146, 147, Applied Calculus I, II6 or
MATH 165, 166, Calculus I, II
Total

Physics Courses

PHYS 211, 211L, College Physics I, Lab or
PHYS 251, 251L, Univ Physics I, Lab ⁷ 4-5
PHYS 212, 212L, College Physics II, Lab or
PHYS 252, 252L, Univ Physics II, Lab 4-5
Total

Skills Courses

CSCI 122 or 126, BASIC or FORTRAN
ENGL 321, Tech Writing for Engrs
Total
Total Core Requirements

¹ 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.

- ² The following courses are strongly recommended: SOIL 210, 217, GEOL 300, 301, 302, 303, 304, 413, 414, 428, and GEOG 161, 455, 456.
- ³ A fee will be charged to offset travel costs associated with GEOL 301, 302, 303, 304, 450, and 496.
- ⁱ 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.
- ⁵ Some may bave bad adequate mathematics preparation in bigb school. For those who bave not, MATH 103 (College Algebra) and MATH 105 (Trigonometry) are recommended.
- ⁶ 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.
- ⁷ 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.

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.matb.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 Curriculum **Mathematics Major**

	Credits
First Year I	7 S
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 Success1	-
General Electives ¹ 3	6
Totals	5 16
Second Year	
MATH 265, Calculus III	-
MATH 266, Differential Equations	3
MATH 270, Abstract Mathematics ² 3	-
MATH 429, Linear Algebra	3
PHYS 251-L, 252-L, Univ Physics I, II ³ 5	5
Wellness	2
General Electives ¹	3
Totals	5 16
Third Year	
MATH 420, 421, Abstract Algebra I, II 3	3
MATH or Related Electives 4	9

MATH 420, 421, Adstract Algebra 1, II 5	Э
MATH or Related Electives ⁴	9
General Electives ¹	3
Fotals	15

Fourth Year

MATH 450, 451, Real Analysis I, II	3
MATH 491, Senior Seminar1	-
MATH or Related Electives ⁴ 9	9
General Electives ¹	3
Totals	15
Curriculum Total	123

¹ In choosing electives, a student must satisfy the general education requirements for a B.A. or B.S. degree.

- ² 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.
- 3 The PHYS 251-L/252-L laboratory sequence is one of four 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.
- ⁴ 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 480, 481, 482, 483, 488, 489, STAT 467, CSCI 453.

Sample Curriculum **Mathematics and Computer Science**

	Credi	ts
First Year	F	<u>s</u>
COMM 110, Fund of Public Speaking	- 3	3
CSCI 160, 161, Comp Science I, II	4 4	4
ENGL 110, 120, College Composition I, II	3	3
MATH 165, 166, Calculus I, II	4 4	4
UNIV 189, Skills for Academic Success	1 .	
General Electives ¹	3	3
Totals \ldots $\overline{1}$	5 1	7
Second Year		
CSCI 235, 236, Theoretical Comp Science I, II	3	3
MATH 265, Calculus III	4 -	
MATH 266, Differential Equations	- 3	3

MATH 270, Abstract Mathematics ²	
MATH 429, Linear Algebra	3
PHYS 251-L, 252-L, Univ Physics I, II ³ 5	5
Wellness	2
Totals 15	16
Third Year	
CSCI 373, Assembly Programming	
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 ¹	6
Totals 15	15
Fourth Year	
CSCI 366, Database Systems	
CSCI 458, Microcomputer Graphics3	-
CSCI 474, Operating Systems	3
CSCI 489, Capstone Course	3
MATH 430, Graph Theory	
MATH 436, Combinatorics	3
MATH 491, Senior Seminar1	
STAT 367, Probability	
STAT 368, Statistics	3
General Electives ¹	3
Totals	15
Curriculum Total	124
¹ In cboosing electives, a student must satisfy the ge education requirements for a B.A. or B.S. degree.	eneral

² 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.

³ The PHYS 251-L/252-L laboratory sequence is one of three approved laboratory sequences (including Chemistry) for this double major. For more details on other approved laboratory sequences, students should contact the Departments of Mathematics or Computer Science.

Sample Curriculum **Mathematics and Physics**

	Credits
First Year I	7 S
COMM 110, Fund of Public Speaking	3
CSCI 160, Comp Science I	-
ENGL 110, 120, College Composition I, II 3	3
MATH 165, 166, Calculus I, II	4
PHYS 180, Contemporary Concepts1	
UNIV 189, Skills for Academic Success 1	
General Electives ¹	3
Totals \ldots $\overline{10}$	5 13
Second Year	
MATH 265, Calculus III	-
MATH 266, Differential Equations	3
MATH 270, Abstract Mathematics ² 3	
MATH 429, Linear Algebra	3
PHYS 251-L, 252-L, Univ Physics I, II 5	5
Wellness	2
General Electives ¹ <u>3</u>	3
Totals 15	5 16
Third Year	
MATH 420, 421, Abstract Algebra I, II 3	3
PHYS 350, Modern Physics	-
PHYS 351, Mechanics I	-
PHYS 361, Electromagnetic Theory 4	-
PHYS 401, Properties of Solids	3
PHYS 402, Optical Electronics	3
General Electives ¹	6
Totals \ldots $\overline{10}$	5 15
Fourth Year	
MATH 450, 451, Real Analysis I, II	3
MATH 488, 489, Numerical Analysis I, II3	3
MATH 491, Senior Seminar1	-
PHYS 462, Thermodynamics	
PHYS 471, Advanced Laboratory	2
PHYS 485, 486, Modern Physics I. II 3	3

PHYS 489, Capstone Course. -

College o	f Science	and Λ	<i>Nathematics</i>	97
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General Electives ¹	3
Totals	15
Curriculum Total	122

In choosing electives, a student must satisfy the general education requirements for a B.A. or B.S. degree.

² MATH 270 is offered only once a year in the fall semester.

Sample Curriculum **Mathematics and Statistics**

	Cr	edits
First Year	F	5
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 ¹	3	6
Totals	15	16
Second Year		
MATH 265. Calculus III.	4	

MATH 266, Differential Equations	3
MATH 270, Abstract Mathematics ² 3	-
MATH 429, Linear Algebra	3
PHYS 251-L, 252-L, Univ Physics I, II ³ 5	5
STAT 330, Intro Statistics	3
Wellness	2
General Electives ¹	-
Totals \ldots $\overline{15}$	16

Third Year

MATH 420 Abstract Algebra I	
STAT 461, Regression Models	
STAT 462, Experimental Design	3
Statistics Electives ⁴ 3	- 3
General Electives ¹	9
Totals 15	15

Fourth Year

MATH 450, 451, Real Analysis I, II	3
MATH 491, Senior Seminar 1	-
STAT 467, 468, Mathematical Stats I, II 3	3
STAT 491, Capstone Seminar	1
Statistics Electives ⁴	3
General Electives ¹	6
Totals	16
Curriculum Total	122

- ¹ In choosing electives, a student must satisfy the general education requirements for a B.A. or B.S. degree.
- ² MATH 270 is offered only once a year in the fall semester:
- ³ The PHYS 251-L/252-L laboratory sequence is one of four approved laboratory sequences (including Chemistry and Computer Science) for this double major. For more details on other approved laboratory sequences, students should contact the Departments of Mathematics or Statistics.

Statistics electives include any 400 level 3 credit Statistics courses other than those listed above.

Sample Curriculum **Mathematics and Statistics** (Pre-Actuarial Science Option)

	Credi	ts
First Year	F S	s
COMM 110, Fund of Public Speaking	- 3	3
CSCI 160, 161, Comp Science I, II	4 4	í
ENGL 110, 120, College Composition I, II	3 3	3
MATH 165, 166, Calculus I, II	4 4	í
STAT 330, Intro to Statistics	3 -	-
UNIV 189, Skills for Academic Success	1 -	-
Totals	5 1	4
Second Year		
ACCT 200,201, Elements of Acctg I, II	3 3	3

ACCT 200,201, Elements of Acctg I, II	33
ECON 201, Microeconomics	3 –
ECON 202, Macroeconomics	- 3

MATH 265, Calculus III	
MATH 266, Differential Equations	3
MATH 270, Abstract Mathematics ² 3	-
MATH 429, Linear Algebra	3
STAT 461, Regression Models	-
STAT 462, Experimental Design	3
Totals	15
Third Year	

CSCI 455, Linear Programming 5	
CSCI 454, Operations Research	3
MATH 488, Numerical Analysis I 3	
PHYS 251-L, 252-L, Univ Physics I, II ³ 5	5
STAT 467, 468, Mathematical Stat I, II3	3
General Electives ¹	3
Statistics Elective ⁴	3
Totals 17	17

Fourth Year

MATH 376, Actuarial Exam Study	1
MATH 450, 451, Real Analysis I, II	3
STAT 476, Actuarial Exam Study	1
Business & Economics Electives ⁵ 6	3
Statistics Electives ⁴	3
General Electives ¹	3
Wellness	2
Totals	16
Curriculum Total	125

¹ In choosing electives, a student must satisfy the general education requirements for a B.A. or B.S. degree.

² MATH 270 is offered only once a year in the fall semester.

- The PHYS 251-L/252-L laboratory sequence is one of five 3 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.
- Statistics electives include any 400 level 3 credit Statistics courses other than those listed above.
- 5 Business and Economics electives include BUSN 340, 441, 442, 444, 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.pbysics.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 is also 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, 252, 252L, 350, 351, 361, 401, 402, 462, 471, and 485. plus at least two courses selected from PHYS 352, 463, 486 or Minnesota State University Moorhead (MSUM) PHYS 340, 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 Curriculum Physics Major

	Credits
First Year	F S
CHEM 121, General Chemistry I	3 -
CHEM 122, General 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
UNIV 189, Skills for Academic Success	1 -
Totals	15 15
0 1 1	
Second Year	2
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 350, Intro to Modern Physics	- 3
Computer Language	3 3
Wellness	2 -
Electives	3 3
Totals	17 15
Third Year	
MATH 488, Numerical Analysis I	3 -
MATH 489. Numerical Analysis II	- 3
MSUM ¹ PHYS 330, Intermediate Mechanics .	4 -
PHYS 361, Electromagnetic Theory	4 -
PHYS 411/L, Optics for Scientists &	
Engineers/Lab	- 3/1
Humanities & Soc & Behavioral Sci Electives	6 7
Totals	17 14
Fourth Year	
MATH 480, Differential Equations	3 -
MATH 483, Partial Differential Equations	- 3
PHYS 401, Engineering Physics I:	
Fund Properties of Solids	- 3
PHYS 462, Heat & Thermodynamics	3
PHYS 471, Advanced Laboratory	- 2
PHYS 485, Modern Physics I	3 -
PHYS 486, Modern Physics II	- 3
PHYS 489, Physics Projects	- 3
Electives/General Education.	6 3
Totals 1	15 17
Curriculum Total	125

¹ = MSUM Minnesota State University Moorbead

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.

Cuadito

Recommended Curriculum Computational Physics Option

	Cre	uns
First Year	F	\$
CHEM 121, General Chemistry I	. 3	-
CHEM 122, General Chemistry II		3
CSCI 160, Com 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
UNIV 189, Skills for Academic Success	. 1	
Totals	15	16
Second Year		
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 350, Intro to Modern Physics		3
ECE 173, Intro to Computing	. 3	-
Wellness	. 2	
General Education/Electives.	. 3	3
Totals	17	15
Third Year		
MATH 488, Numerical Analysis I	. 3	-
MATH 489, Numerical Analysis II		3
MSUM ¹ PHYS 330, Intermediate Mechanics	. 4	
PHYS 361, Electromagnetic Theory	. 4	-
PHYS 411/L, Optics for Scientists		
& Engineers/Lab	3/1	
STAT 367, Probability	. 3	
STAT 368, Statistics		3
General Education/ Electives	. 3	7
Totals	16	17
Fourth Year		
MATH 480, Differential Equations	. 3	-
MATH 483, Partial Diff Equations		3
PHYS 462, Heat & Thermodynamics	. 3	-
PHYS 463, Statistical Mechanics		3
PHYS 471, Advanced Laboratory		2
PHYS 485, Modern Physics I	. 3	
PHYS 486, Modern Physics II		3
PHYS 489, Physics Projects		3
Electives/General Education.	. 6	3
Totals	15	17
Curriculum Total		128

1 = MSUM Minnesota State University Moorbead

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 Curriculum Optical Science and Engineering Option

	Cr	edits
First Year	F	\$
CHEM 121, General Chemistry I	. 3	-
CHEM 122, General Chemistry II		3
ECE 173, Intro to Computers	. 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
UNIV 189. Skills for Academic Success	. 1	_
General Education/Electives.	. 3	-
Totals	16	16
Second Year		
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 350, Intro to Modern Physics		3
EE 206, Circuit Analysis I		4
Wellness	. 2	
General Education/Electives	. 6	3
Totals	17	16
Third Year		
PHVS 361 Electromagnetic Theory	4	_
PHVS /11 Optics	. 1	
PHVS /111 Optics Sci & Epgr Lab	. 5	
PHVS 462 Heat & Thermodynamics	. 1	
PHILS 402, Heat & Hiermodynamics	. 5	-
FGE 221 Electronics I		2
ECE 521, Electronics I		2
ECE 417, Optical Signal Irans		2
General Education/ Electives	. 0	15
lotais	1 /	15
Fourth Year		
MATH 488, Numerical Analysis I	. 3	-
MATH 489, Numerical Analysis II		3
PHYS 401, Fund Prop of Solids,		3
PHYS 415. Elements of Photonics		3
PHYS 485, Modern Physics I	.3	-
PHYS 489. Physics Projects	3	
ECE 483. Instrumentation for Eng	.3	
Electives/General Education	.3	6
Totals	15	15
Curriculum Total		127

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/psycbology

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 the department Web page (www.ndsu. edu/ndsu/ psychology/advising/) 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 B.S. 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 which must include:
 - 1. Social and Behavioral Science (not psychology): six credits
 - 2. Humanities and Fine Arts: six credits
 - College requirement: six credits, any humanities or social science courses (not psychology)
- E. Wellness: two credits
- E 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
PSYC 463, Experimental Developmental Psyc3
PSYC 464, Attention & Thinking

Area 4: Capstone Experience

PSYC 480, History & Systems	3
PSYC 489, Honors Thesis 2-0	5

Electives:

PSYC, 400-level courses ¹			•	 • •		 ·	• •	• •		. 6	,
PSYC, free choice on cou	rse	lev	vel							.6	,

- ¹ 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 (may also be counted in Category D)
- I. Global Perspectives: three credits (may also be counted in Categories C or D)
- J. Electives: To total 122 credits
- K. At least 37 credits must be obtained in 300/400level 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 Curriculum B.S. with Psychology Major

	Credits
First Year	F S
ANTH 111, Intro Anthropology	3 -
BIOL 126, Human Biology	3 -
CHEM 117, 117L, Chem Concepts &	
Appli, Lab	- 3,1
CSCI 116, Busn Use of Computers or	
CSCI 114, Microcomputer Pkgs	- 3-4
ENGL 110, 120, College Composition I, II	3 3
MATH 103, College Algebra or	
MATH 104, Finite Math	3 -
PSYC 111, Intro Psyc	3 -
SOC 110, Intro Sociology	- 3
UNIV 189, Skills for Academic Success 1	1 –
Psychology 200-level Elective	- 3
Totals	6 16-17
Second Year	

COMM 110, Fund of Public Speaking3	
PSYC 350, Research Meth I	

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
Third Year		
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
Fourth Year		
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	124-1	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

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:

Requirements:	Credits
STAT 367, Probability	3
STAT 368, Statistics	3
STAT 461, Applied Regression Models	3

STAT 462, Intro Experimental Design	
Five courses from the following:	
CSCI 161, Comp Science II or	
CSCI 228, Computing Fund II or	
CSCI 418, Simulation Models	
MATH 429, Linear Algebra	
STAT 450, Stochastic Processes	
STAT 451, Bayesian Stat Dec Theory	

STAT 451, Bayesian Stat Dec Theory
STAT 460, Applied Survey Sampling
STAT 463, Nonparametric Statistics
STAT 464, Discrete Data Analysis
STAT 465, Meta-Analysis Methods
STAT 467, Probability/Math Stats I
STAT 468, Probability/Math Stats II
STAT 470, Stat SAS Programming

Additional requirements:

-
CSCI 126, Beginning Fortran or
CSCI 160, Computer Science I or
CSCI 227, Computing Fund I
CSCI 222, Discrete Math or
MATH 270, Intro Abstract Math
MATH 165, Calculus I
MATH 166, Calculus II
MATH 265, Calculus III

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, 151L, 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 Curriculum Statistics Major

	Credits
First Year	F S
COMM 110, Fund Public Speaking	3 -
CSCI 126, Fortran or	
CSCI 160, Comp Science I or	
CSCI 227, Computing Fund I	- 3-4
ENGL 110, 120, College Composition I, II	3 3
MATH 165, 166, Calculus I, II	ú 4
UNIV 189, Skills for Academic Success 1	l –
Wellness	- 2
Electives ¹	5 3
Totals \ldots $\overline{1}$	7 15-16
Second Year	
MATH 265, Calculus III	4 -
STAT 367, Probability	3 –
STAT 368, Statistics	- 3
Electives ¹) 12
Totals 1	6 15
Third Year	
MATH 270, Intro Abstract Math or	
CSCI 222, Discrete Math	3 –
STAT 461, Applied Regression Models 3	3 –
STAT 462, Intro Experimental Design	- 3
Electives ¹	59
STAT Electives	3 3
Totals \ldots $\overline{1}$	5 15
Fourth Year	
STAT 491, Capstone Seminar	- 1
Electives ¹) 10
STAT Elective(s)	5 3
Totals \ldots $\overline{1}$	5 14
Curriculum Total	122-123

1 Electives must be used to satisfy the general education requirements including bumanities, social/bebavioral 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 board 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 Curriculum Pre-Actuarial Science Option

	Credits
First Year F	5
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
STAT 330, Intro Statistics	-
UNIV 189, Skills for Academic Success 1	-
Totals	14
Second Year	
ACCT 200, 201, Elements Acct I, II 3	3
ECON 201, 202, Prin Micro, Macro,	3
MATH 265. Calculus III	-
MATH 266. Intro to Diff Equations	3
MATH 270. Intro to Abstract Math	-
MATH 429. Linear Algebra	3
STAT 461. Applied Regression Models	-
STAT 462. Intro/Experimental Design	3
Totals $\overline{16}$	15
Third Year	
CSCI 453, Linear Prog & Network Flows 3	-
CSCI 454, Operations Research	3
MATH 450, Real Analysis I	-
Science Option ⁴	4
STAT 467, 468, Prob/Math Stat I, II	3
Humanities & Fine Arts ¹	3
Statistics 400-Level Elective ²	3
Totals	16
Fourth Year	
MATH 376. Actuarial Exam/Capstone 1	-
MATH 451. Real Analysis II or	
MATH 489, Numerical Analysis II	3
MATH 488, Numerical Analysis I	_
STAT 476, Actuary ExamII/Capstone	1
Business or Economics Electives ³ 3	6
Social/Behavioral Science Electives ¹ 3	3
Statistics 400-Level Electives ²	3
Wellness	-
Totals \ldots $\overline{15}$	16

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.

- ¹ 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 bours in Humanities and Social Sciences required by the College of Science and Mathematics.
- ² Statistics electives include any additional 400-level, 3credit statistics course.
- ³ Business or Economics electives must be taken from BUSN 340, 441, 442, 444, ECON 341, 343 or any 400-490 level ECON course.
- ⁴ 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 II/L (3/1); or CHEM 121/121L, General Chemistry I/L (3/1); and CHEM 122/122L, General Chemistry I/L (3/1); or CHEM 150/160, Principles of Chemistry II. (3/1); or

Note: Plus two more credits in Science and Technology category; or PHYS 251/251L, University Physics I/Lab (5/1) 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 Curriculum Behavioral Statistics Major

	Credits
First Year	F S
ANTH 111, Intro to Anthropology	3 -
BIOL 126, Human Biology	3 -
CSCI 114, Microcomputer Packages or	
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 3
MATH 103, College Algebra or	
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	l –
Totals 1	6 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	5 3
Social Science Elective	3 –

Wellness	
Totals	14
Third Year	
PSYC 351, Research Meth II	-
STAT 4603, Applied Survey Sampling or	
STAT 463 ³ , Nonparametric Statistics or	
STAT 465 ³ , Meta-Analysis Methods3	-
STAT 462, Intro/Experimental Design	3
PSYC Required Course ²	3
PSYC 200- or 300-Level Elective	-
PSYC 400-Level Elective	3
Social Science Elective	
Electives ¹ 3	6
Totals	15

Fourth Year

STAT 4603, Applied Survey Sampling or	
STAT 4633, Nonparametric Statistics 3	
STAT 470, Statistical SAS Program	3
Behavioral Stat Capstone Exp	3
PSYC Required Courses ²	3
PSYC 400-Level Elective	-
Electives ¹	5
Totals	14
<i>Curriculum Total</i>	-123

¹ Electives must be used to satisfy the general education requirements. There are an additional six credit bours in Humanities and Social Sciences required by the College of Science and Mathematics.

² Psychology Requirements:

A. Social Bases of Bebavior

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

³ 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 331 or 461, 367, 368, 462, 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 Morrill 112 (701) 231-7014 David A. Wittrock, Interim Dean

Programs in the College of University Studies are designed for students with general needs or unique goals. These programs involve general studies for the 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 universitylevel 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 academ-

ic 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 of Public Speaki	ng	z .					(3
ENGL 110, 120, College Compositi	or	ı I	, II				(6)

Credits



Beg BASIC/Visual BASIC; CSCI 125, Beginning COBOL, *or* STAT 330, Introductory Statistics

Science & Technology10 A laboratory course is included in this requirement.
Humanities & Fine Arts
Social & Behavioral Sciences
Wellness
Capstone1
Total

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 reentry. B.U.S. proposals are subject to the NDSU baccalaureate degree requirements.

For further information, contact the following:

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The Graduate School

www.ndsu.edu/gradschool/ Old Main 201 (701) 231-7033 David A. Wittrock, Interim 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, 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.

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.

The graduate program is administered by the dean of The Graduate School assisted by a Graduate Council composed of six elected and six appointed faculty members, and two appointed graduate students.

Admission to Graduate Study

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. Application and personal reference report forms may be obtained from The Graduate School or from the departments offering graduate programs. 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 September 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:

 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.



- 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. The applicant at the baccalaureate level 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.
- 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 dean of The Graduate School.

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.

General Requirements for Master's Degrees

Minimum requirements for all master's degrees include the following items.

Master's Degree 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 dean of The Graduate School.A candidate for the master's degree must petition in order to transfer up to a maximum of eight (8) (Thesis Option) or nine (9) (Comprehensive Study Option) 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

The candidate 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 or paper, 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 dean of The Graduate School. 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 is then presented to The Graduate School for editing and format checking by a 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 Office of Graduate Studies along with a receipt from the Business Office for binding fees. 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 (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 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 Graduate School.

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/)

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 M.S. degree.

Residence Requirement

Graduate study for the Doctor of Philosophy degree normally requires a minimum of three (3) years 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 assistants wishing to register for more than twelve (12) credits in a regular semester shall secure the approval of their academic dean and the dean of The Graduate School.

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 dean of The Graduate School 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, 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: Agricultural Economics Agricultural and Biosystems Engineering Agricultural Education Animal and Range Sciences Biochemistry Biology Botany **Business Administration** Cereal Science Chemistry Child Development and Family Science **Civil Engineering** Coatings and Polymeric Materials Computer Science Counseling and Guidance Education Educational Administration Electrical Engineering **Emergency Management** English Entomology Environmental and Conservation Science Environmental Engineering Family and Consumer Sciences Education Food Safety Genomics History Horticulture Industrial Engineering and Management International Agribusiness Manufacturing Engineering Mass Communication Mathematics Mechanical Engineering 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 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 History (joint program with UND) Human Development Industrial and Manufacturing Engineering Mathematics Mechanical Engineering Molecular Pathogenesis Music Natural Resources Management Nursing Practice Pharmaceutical Sciences Physics Plant Pathology Plant Sciences Psychology Software Engineering Soil Science Statistics Transportation and Logistics Zoology

1-4

Course Descriptions Courses approved at the time of publication are

listed in this bulletin. Not all courses are offered every term. Refer to the "Registration Schedule" published each term or the online schedule of classes 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.

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 departments 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- 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. Other 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 the Academic Policies sections of this bulletin, in the registration schedule each term, and online at 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 are 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: H - honors course; L - laboratory course. The number system is as follows:

001-099 - non-degree credit courses1

- 100 series courses open to freshmen
- 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 level
- 700-799 series courses open to graduate students
- ¹ Any 100-level course offered for non-degree credit is noted in the course description.

Note: 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.

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

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 (CCN) 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**

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

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

1-8

1-3

Practicum/Internship 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

1-5

1-3

1-3

Literature review, research, and preparation for paper required for the comprehensive study option. Graded S or U.

(Prefix) 797R

Paper Continued Registration

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 advisor and a supervisory committee. Graded S or U.

(Prefix) 798R

Thesis Continued Registration

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
	Î 0 1 1

major advisor and an advisory committee. Graded S or U.

(Prefix) 799R

Dissertation Continued Registration 1-3Continued 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)

Harter, Chair; Brown, Clifton, Dietz, Dowdell, Glatt, Klamm, Knoepfle, 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 operating activities of companies. 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 the investing and financing activities of a company. 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 (CNN) 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

Study of accounting standards and procedures applicable to government and not-for-profit institutions. Prereq: ACCT 201. Recommended: ACCT 311.

410/610 Fraud Examination

1-3

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.

413 Accounting Internship

Supervised professional experience in a non-paid position. Prereq: Advisor or departmental approval.

415/615 Advanced Accounting

Study of advanced topics including consolidated statements, international operations, and derivative financial instruments. Prereq: ACCT 312.

418/618 Tax Accounting I

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

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.

420/620 Accounting Information Systems

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

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

Advanced application of audit principles in organizational situations through case studies and the investigation of current issues in auditing. Prereq: ACCT 421.

430 Tax Practice and Research 3 Study of the fundamental concepts of tax practice and tax research methods. Prereq: ACCT 418 or 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

Study of management's use of cost management methods to plan and evaluate business activities. Prereq: Departmental approval.

AEROSPACE STUDIES (AS) (AIR FORCE ROTC)

Keating, Chair; Wentzell, Korver, Moon, Yackley

COURSES

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110 Air Force ROTC Fitness Physical Training classes are designed to make students aware of the benefits of being physically fit and participating in lifetime fitness programs. F, S

111 The Air Force Today I

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Introduces students to the U.S.Air Force and provides an overview of the basic character, missions, and organization of the Air Force. F

112 The Air Force Today II

Continuation of AS 111; provides an overview of the basic characteristics, missions, and organization of the Air Force. S

210 Leadership Laboratory

Introduction to Air Force customs and courtesies, drill and ceremonies, and military structure. 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

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

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. F, S

441 Preparation for Active Duty I

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

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; Interim Chair, Bon, Disrud, Panigrahi, Solseng, Steele, Wiesenborn

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COURSES

110 Introduction to Agricultural and

Biosystems Engineering2Introduction to the agricultural and biosystemsengineering profession with emphasis on engineering problem solving. 2 lectures. F

189 Skills for Academic Success

See University Interdisciplinary Studies for description.

255 Computer-Aided Analysis and Design

Application and use of software for engineering design, analysis, and graphical communication. 3 lectures. F

263 Biological Materials Processing

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 or equivalent. S

358 Electric Energy Application in Agriculture

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

377 Numerical Modeling in Agricultural and Biosystems Engineering

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

383 Structural Design for Biosystems

Study of framing systems, building materials, and load requirements. Analysis and design of structures for biosystems. 3 lectures. Prereq: ME 223. F

444/644 Transport Processes

Energy and mass transport principles applied to biological and environmental systems. Prereq: MATH 266 and CE 309 or ME 352.

452/652 Bioenvironmental Systems Design 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

458/658 Food Process Engineering

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

464/664 Resource Conservation and Irrigation Engineering

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

473/673 Agricultural Power

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

478/678 Machinery Analysis and Design 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

482/682 Instrumentation and

Measurements

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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

486 Design Project I

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

487 Design Project II

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

758 Applied Computer Imaging and Sensing for Biosystems

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. Prereq: Graduate standing.

763 Theory of Drying Biological Products 3

Theory used to describe the drying processes of biological products. 3 lectures. Prereq: Graduate standing. F

765 Small Watershed Hydrology and Modeling

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

773 Advanced Agricultural Power and Machinery

Theory and design of agricultural power units and field machines. 3 lectures. Prereq: ABEN 473/673.F

783 Advanced Structures and Environmental Systems

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, Leistritz, B. Leitch, Mack, Nganje, Petry, Rathge, Shultz, Swenson, Tweeten, Wachenheim, Wilson

COURSES

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150 Quantitative Economics (CNN)2Application of algebra and calculus to price theo-
ry. 2 lectures. Prereq: MATH 103.

220 World Agricultural Development (CNN) 3 Introduction to theories, policies, and practices to increase food production and agricultural development in developing countries. **2** lectures. Prereq: ECON 201. (ND:SS)

242 Introduction to Agricultural Management (CCN)

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.

244 Agricultural Marketing (CCN)

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.

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246 Introduction to Agricultural Finance I (CCN)

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.

339 Quantitative Methods and Decision Making

Application of basic probability concepts to decision analysis, introduction to linear programming models, and decision-free analysis. 3 lectures. Prereq: ECON 201 and AGEC 150 or MATH 146.

342 Farm and Agribusiness Management II 3 Application of production economics principles to farm and agribusiness operations. Economic input-output principles and profit maximization. 2 lectures, 1 laboratory. Prereq:AGEC 242.

344 Agriculture Price Analysis

Introduction to price analysis in agricultural markets. 3 lectures. Prereq: AGEC 244.

346 Agricultural Finance II

Development of tools to analyze financial and credit use problems unique to farms, ranches, and agribusinesses. For Agricultural Economics majors. 3 lectures.

347 Principles of Real Estate

Principles and techniques of real estate appraisals, practical application of appraisal principles, and techniques to real property evaluation. 2 lectures, 1 laboratory. Prereq: ECON 201. Cross-listed with BUSN.

350 AgriSales

The principles of salesmanship applied to the agricultural business. Topics include attitudes

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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.

360 International Agribusiness Experience 3

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.

374 Cooperatives

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.

375 Applied Agricultural Law (CCN)

Study of laws affecting agriculture and agribusiness including property ownership, financial relations, and environmental regulation. 2 lectures.

378 Introduction to Transportation and Logistics

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.

420 Integrated Farm and Ranch Management 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:AGEC 242, 244, or 246.

444/644 Crops Marketing

Capstone course for commodity marketing option. Advanced work on topics related to marketing of crops. 2 lectures. Prereq: AGEC 344. Coreq: AGEC 339.

445 Agribusiness Industrial Strategy 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: AGEC 344. Coreq:AGEC 339.

446/646 Agribusiness Finance 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:AGEC 339, 346.

450 National AgriMarketing Association (NAMA) I

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.

451 National AgriMarketing Association (NAMA) II

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. **452/652 Food Laws and Regulations** See Food Safety for description.

470/670 Agricultural Trade

Introduction to trade theory and policies and their applications to agricultural product trade. 2 lectures.

472/672 Advanced Logistical Analysis

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 shipping firms. Prereq:AGEC 378 and AGEC 339 or BUSN 352.

484 Agricultural Policy

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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.

701 Research Philosophy

Role of the scientist, reasoning, values, and decisions. Problem formulation, literature review, hypothesis development, data collection, analysis, and interpretation. 1 lecture.

710 Econometrics

Applications of statistical methods to specification, estimation, and forecasting of linear economic models including multiple regression models, cross-section data analysis, time-series data analysis, and qualitative dependent variable models. 4 lectures, first half of semester.

711 Advanced Topics in Econometrics 1-3

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:AGEC 710.

720 Food Safety Costs and Benefits Analysis 3 See Food Safety for description.

725 Food Policy

See Food Safety for description.

739 Analytical Methods for Applied Economics

Study and application of operations research techniques and other decision methods to problems in agriculture, transportation, and resource management. 3 lectures. Prereq: MATH 146.

741 [ECON] Advanced Microeconomics

Advanced analysis of demand, production, and costs; pricing output and resource allocation under various market structures. Prereq: ECON 341, MATH 146, Graduate standing.

743 [ECON] Advanced Macroeconomics

Advanced analysis of macroeconomic theories; economic growth, business fluctuations, and inflation. Prereq: ECON 343, MATH 146.

744 Agribusiness I: Agricultural Product

Marketing and Agribusiness Strategy3Conceptual foundations of agribusiness strategy,food product marketing, and strategic planning arepresented. Emphasis is placed on quantitative strategic decision making for the agribusiness firm.

3 746 Agribusiness II: Agrifinance and Commodity Trading

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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.

771 Economics of Transportation Systems

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.

772 Rural Logistics and Distribution Management

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

115 Fundamentals of Agricultural

Systems Management (CCN) 3 Overview of agricultural systems management;

engines, machinery, structures, electricity, processing, and conservation. 3 lectures. Coreq: MATH 103, 104, or higher.

125 Fabrication and Construction

Technology (CCN)

Introduction to materials, methods, and tools used in fabrication, installation, and maintenance of agricultural production and processing facilities. 2 lectures, 1 three-hour laboratory.

225 Computer Applications in

Agricultural Systems Management (CNN) 3 Application and use of software for problem solving, reporting, and graphical communication. 3 lectures. Prereq: CSCI 114 or 116.

259 Measurements in Natural

Resource Systems

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Surveying, data acquisition, area and volume determinations, and other measurement calculation techniques in planning and management of natural resource systems.

264 Natural Resource Management Systems (CNN)

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 or 104. Cross-listed with NRM.

323 Post-Harvest Technology

Principles and management of crop and feed storage, handling, drying, processing, and crop/feed systems siting, planning, and development. 3 lectures. Prereq: MATH 103 or 104.

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354 Electricity and Electronic Applications (CCN)

Fundamentals and applications of electricity, power distribution, controls, motors, and solidstate electronics. For non-engineering majors. 2 lectures, 1 three-hour laboratory. Prereq: Junior standing and MATH 103 or 104.

368 Structures and Environment Systems

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 or 104.

373 Tractors and Power Units (CCN)

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 or 104.

374 Power Units Laboratory (CCN)

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 or 104.

378 Machinery Principles and Management (CCN)

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 or 104.

429 Hydraulic Power Principles and Applications

Study of fluid power principles, components, schematics, and systems. Emphasis is on proper use, maintenance, and applications of hydraulic power equipment. Prereq: MATH 103, PHYS 211, Junior standing.

454/654 Principles of Site Specific Agriculture

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 or 104.

468 Golf Course Irrigation I	2
See Plant Sciences for description.	
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469 Golf Course Irrigation II	1
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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)

Jensen, Dean

COURSES

150 Agriculture Orientation (CNN)

Introduction to opportunities and professional advancement in agricultural careers. Overview of majors offered in the College of Agriculture, Food Systems, and Natural Resources, activities, and support services.

189 Skills for Academic Success (CNN) 1 See University Interdisciplinary Studies for description.

ANIMAL AND RANGE SCIENCES (ARSC)

Odde, Chair; Barker, Bauer, Berg, Berryhill, Biondini, Blanchetot, Caton, Colville, Danielson, Grazul-Bilska, Grygiel, Harrold, Haugen, Kirby, Lardy, Marchello, Moore, Park, Redmer, Reynolds, Schroeder, Sedivec, Socha, Stoltenow, Tilton, Turner

COURSES

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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)

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)

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)

Relationship between live animal characteristics and structure to product value. 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 (CNN) 2 Care, management, and feeding of light horses. 2 one-hour lectures. F

260L Equine Care and Management Practicum (CNN)

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

Grooming, saddling, bridling, mounting, balanced seat, and coordination of the riding aids will be addressed. 1 two-hour laboratory. Lab fee required. Enrollment priority will be given to Equine Studies Major/Minor/Certificate students.

263 Introduction to Animal Biotechnology

Basic aspects of animal biotechnology, biotechnology in health, biotechnology in reproduction, biotechniques. 3 lectures. Prereq: BIOL 126 or 150. S

320 Dairy Cattle Selection

Visual appraisal, selection, and evaluation of dairy cattle. Type classification of dairy cattle. 2 three-hour laboratories. May be repeated. Prereq: Departmental approval.

323 Fundamentals of Nutrition

Fundamentals of nutrition emphasizing digestion, metabolism, function, requirements, and sources of specific nutrients. 3 lectures. Prereq: ARSC 123, BIOC 260, or departmental approval. F

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 or departmental approval.

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 or departmental approval.

336 Introduction to Range

Management (CCN) 3 Principles of range management that 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 prod-

ucts. 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

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

Discussion of basic biological processes and their application to management of equine nutrition, exercise and conditioning, and reproduction. 3 lectures. Prereq: VETS 135, ARSC 123, 260, 323. F

365 Equine Evaluation

Detailed study of horse conformation, selection criteria, and judging standards for equine competitions. Emphasis will be placed on development

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110 Course Descriptions

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

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 [710] Rangeland Resources Watershed Management

Watershed Management3Study of the management of physical/biologicalsettings and processes along with human activitieson water and watersheds considering preven-tative and restorative strategies in a rangelandsetting. Prereq:ARSC 336 or NRM 225. Cross-listedwith NRM.

456/656 Range Habitat Management3Capstone course to include specific techniquesand systems approaches to maintenance and improvement of rangeland ecosystems. 3 lectures.Prereq:ARSC 336. S (odd years)

458/658 Grazing Ecology3Grazing processes and systems and their effectson plants and herbivores. 3 lectures. Prereq: ARSC336. S (even years)

460/660 Plant Ecology3See Biological Sciences (Botany) for description.

463/663 Physiology of Reproduction 4 Anatomy, physiology, and endocrinology of reproduction in mammals. 3 lectures, 1 two-hour laboratory. Cross-listed with ZOO. S

464 Reproductive Management Procedures 2 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

470 Applied Nutrition 4 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

480 Equine Industry and Production Systems 3 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. S

482 Sheep Industry and Production Systems 2 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, or departmental approval. Half semester.

484 Swine Industry and Production Systems 2

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, or departmental approval. Half semester.

486 Beef Industry and Production Systems

Capstone course includes the management, systems, selection, record keeping, merchandising, and production testing of beef. 3 lectures, 1 twohour laboratory. Prereq: ARSC 220, 336, 357, 463, 470, or departmental approval. Half semester.

488 Dairy Industry and Production Systems 2

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, or departmental approval. S

716 Agrostology

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)

717 Aquatic Vascular Plants

Identification and description of aquatic vascular plants. 1 lecture, 2 two-hour laboratories. Prereq: BOT 314. Cross-listed with BOT. F (odd years)

721 Biology of Lactation

Mammary gland development and mechanisms controlling lactation. 2 lectures. Prereq: BIOC 460.

728 Advanced Reproductive Biology

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)

730 Growth Biology

Regulation of growth at the cell/tissue, organ systems, and whole animal levels. 2 lectures. Prereq: ARSC 463, BIOC 460. S (even years)

736 Experimental Nutrition Methods

Design, conductance, analysis, and reporting of experiments taken in conjunction with ARSC 773, 774, 775, or 776. Prereq: ARSC 470, BIOC 460.

740 Data Analyses and Designs of Experiments

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.

755 Advanced Meat Science

Physical, chemical, and structural characteristics of the postmortem meat animal. 2 lectures. Prereq: ARSC 340, BIOC 460. (even years)

765 Analysis of Ecosystems

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)

773 Energy Metabolism

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)

774 Nitrogen Metabolism

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)

775 Vitamins and Minerals

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)

776 Digestive Physiology

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)

ANTHROPOLOGY (ANTH)

Slobin, Chair: Clark, Kloberdanz, Musiba, Riley

COURSES

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111 Introduction to Anthropology (CCN) 3 Introductory overview of the major divisions of anthropology: cultural and physical anthropology, archaeology, and linguistics. (ND:SS)

204 Archaeology and Prehistory3Introduction to archaeological methods, followed

by a survey of world prehistory.

205 Human Origins

Examination of the evolution of humans through the investigation of fundamental principles of evolution, human variation, comparative primate behavior, and the fossil record.

206 Peoples of the World3

General survey of cultural anthropology and cultures of various regions of the world.

208 Folklore and Culture

Examination of folk traditions (oral, customary, and material) within their cultural context.

209 Introduction to Linguistics3See English for description.

432/632 Human Osteology

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 for 432:ANTH 111, 204, 205. For 632: Departmental or instructor approval.

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433/633 Apes and Human Evolution

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 for 433: ANTH 111, 204, 205. For 633: Departmental or instructor approval.

444/644 Peoples of the Pacific Islands

General survey of cultures, past and present, in Melanesia, Polynesia, and Micronesia.

446/646 Current Problems in Paleoanthropology

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.

447/647 Science and Celebrity in Anthropology

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 for 447:ANTH 111, 204, 205. For 647: Departmental or instructor approval.

450/650 Cultural Anthropology

Examination of the nature of culture, the dynamics of culture, cultural subsystems, and cultural data collection and analysis. Prereq: ANTH 111 or departmental approval.

452/652 North American Indians

General survey of native North American Indian cultures. Focuses on cultural systems as anthropologists have reconstructed them for the pre-contact period.

453/653 Magic and Religion

Comparative religion, religious concepts, practices, and practitioners. In-depth study of selected religious systems with a focus on shamanic religions. Prereq: ANTH 111 or departmental approval. Cross-listed with RELS.

458/658 Indians of the Plains

Ethnographic/ethno-historical survey of major Indian tribes in the Great American Plains region from ancient times to the present.

461/661 Germans from Russia

Study of the cultural and historical background of an important ethnic group in the Great American Plains region - German-speaking people from Russia.

462/662 Cultural Ecology

Analysis of the systematic relationship between human populations and their ecological surroundings. Prereq: Any ANTH course.

465/665 Web-based Media in Anthropology 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, webdesign and Internet dissemination.

480/680 Development of Anthropological Theory

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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 or departmental approval.

489 Senior Capstone in Anthropology

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.

705 Forensic Anthropology

Theory and methods in the recovery, identification, and evaluation of human skeletal remains for criminal investigation purposes.

APPAREL, DESIGN, FACILITY AND HOSPITALITY **MANAGEMENT (ADFH)**

Bastow-Shoop, Head; Amundsen, Bates, Braaten, Hirani, Manikowske, Ragan, Ray-Degges, Sunderlin, Williams, Wolfe

COURSES

140 [F&N 170] Introduction to the **Hospitality Industry**

3 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

141 [F&N 171] Tourism and Travel

Management 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

150 Design Fundamentals — Lecture 3 Study of the elements and principles of design. Coreq:ADFH 151.F,S

151 Design Fundamentals — Studio

Study and application of elements and principles of design; two- and three-dimensional applications. Prereq: Interior Design major. Coreq: ADFH 150. E S

155 Apparel Construction and Fit

Principles of apparel construction and analysis. Construction of a fitting sloper and two fashion garments. F

160 Interior Design and Facility

Management Careers Survey of the interior design and facility management professions and the relationships with allied professionals and organizations. F

161 Interior Graphics I

Fundamentals of technical and graphic communication for interior design documentation. Emphasis on lettering, sketching, and drafting. Prereq:ADFH 150, 151. F, S

171 Fashion Dynamics

Introductory course tracing the development of fashion and its industry that includes consumer demand and fashion change, the development,

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and Promotion

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 or departmental approval. S

281 [181] Aesthetic Analysis in Business and Society

Analysis of aesthetics and its application to textiles and apparel products, environment, and oneself. Prereq:ADFH 150.S

310 History of Fashion

Historic view of the evolution of fashion in the Western world through time as it relates to political/sociological/economic change. F

production, and marketing of goods from concept to consumer, and their interrelationships. F

172 Product Development

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Examination of issues and management strategies necessary to produce a competitively priced product. Analyze, interpret, and forecast trends for marketable products. Understand the role of technology in design, production, and marketing/sales of products. Prereq: ADFH 171 or departmental approval. S

241 [F&N 370] Hospitality Accounting

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; ration analysis; budgeting, financial statement analysis and interpretation. Prereq:ACCT 102,ADFH 140, 141.F

250 Interior Design I — Lecture

Introduction of design theory and process to analyze and design residential environments; introduction to material selection. Prereq: Minimum of 3.00 cumulative GPA, ADFH 150, 151, 161. Coreq: ADFH 251, 263. F

251 Interior Design I - Studio

Application of design theory and process to analyze and design residential environments. Emphasis on programming, schematics, design development, and material selection. Prereq: Minimum of 3.00 cumulative GPA, ADFH 150, 151, 161. Coreq: ADFH 250, 263. F

252 Interior Design II — Lecture

Introduction of design theory and process to analyze and design commercial environments. Emphasis on materials and products developed for commercial installations. Prereq: ADFH 250, 251, 263. Coreq: ADFH 253, 363. S

253 Interior Design II — Studio

Application of design theory and process to analyze and design commercial environments. Programming, schematics, and design development are emphasized. Prereq: ADFH 250, 251, 161, 263. Coreq: ADFH 252, 363. S

263 Interior Technology I

Fundamentals of building construction, materials, and methods for residential and commercial structures. Prereq: ADFH 161. F

271 [371] Visual Merchandising

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315 History of Interiors I

Survey of historical interiors and furnishings beginning with antiquity through the 1800s. F

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316 History of Interiors II 3 Survey of historical and contemporary interiors and furnishings beginning with the 1800s to the present day. S

350 Interior Design III - Lecture 3 Lecture sequence exploring interior products and materials, code issues, and client analysis. Prereq: ADFH 252, 253, program admission. Coreq: ADFH 351.F

351 Interior Design III — Studio Studio sequence of projects requiring identification, analysis, program development, and presentation of a solution to interior design problems. Prereq: ADFH 252, 253, program admission. Coreq:ADFH 350.F

352 Interior Design IV - Lecture 3 Lecture sequence exploring interior products and materials, code issues, budgetary constraints, client analysis, and design theory. Prereq: ADFH 350, 351. Coreq: ADFH 353. S

353 Interior Design IV - Studio Sequence of projects requiring identification, analysis, program development, and presentation of a solution to interior design problems. Prereq:ADFH 350, 351. Coreq: ADFH 352. S

355 Flat Pattern Design and Draping Developing original patterns through flat pattern design and draping for individual and commercial applications. Prereq: ADFH 155 or departmental approval. S

356 Pattern Drafting and Grading 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 or departmental approval. S

360 [F&N 371] Front Office Management 3 Front office procedures; reservations, selling strategies, handling guest inquiries, and night audit functions. Computer application is highlighted. Prereq:ADFH 140, 141.S

363 Interior Technology II 3 Introduction to interior systems and life safety concerns. Prereq: ADFH 161, 263. S

365 CADD for Interiors

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 161, 252, 253. F, S

366 [265] Textiles

Fibers, yarns, fabric construction, finishes, and dyestuffs related to selection, use, and maintenance of textile products. Prereq: ADFH 171, 172. Coreq: ADFH 367. F

367 [266] Textiles Laboratory	1
Textile product characterization through the	anal-
ysis of yarn type, fabric, construction, finishes	s, and
dyestuffs; care procedures; simple identificati	on of

fibers, yarns, and fabrics. Prereq: ADFH 171, 172. Coreq:ADFH 366. F

368 Interior Materials and Maintenance

Examine the characteristics, applications, installation procedures, estimating, specifications and maintenance of materials used in commercial interior spaces. Prereq: ADFH 252, 253, 366, 367 or departmental approval. S

370 [270] Sewn-Product Manufacturing and Analysis

Analysis of the sewn-product manufacturing processes, governmental regulations, sourcing, and technology applications are included. Focus on evaluating products' quality, performance, and cost. Prereq: ADFH 366, 367 or departmental approval. S

372 Global Retailing

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.

380 Facility Operations and Analysis 3 Integrative organizational theory applied to financial structures, management procedures, support functions, and operations within a major facility. Prereq:ACCT 102. F (even years)

381 [F&N 470] Hospitality Marketing and Sales3 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

382 Women in Management 3 Survey of gender issues in management. Analysis of behaviors and attitudes that affect women in the workforce. S

384 [F&N 471] Wines of the World 3 Identification and evaluation of wine with a focus on making quality decisions related to selection, storage, and service. Emphasis on responsible drinking is included in each lesson.

385 Global Fashion Economics

Study of factors affecting production, distribution, and consumption of products in domestic and foreign textile and apparel industries. Prereq: Junior standing and ECON 105, 201, or 202. F

400 Hospitality Cost Control

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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.

401 Convention and Meeting Planning

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 360 or instructor approval. S

402 [F&N 465] Professional Catering Management

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. F

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403 Resort and Spa Operations

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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 360 or instructor approval. F

404 Restaurant Operations Management 3

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

405 Casino Operations

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

410/610 Dress in World Cultures 3

Analysis of world dress as related to cultural, technological aesthetic, and social patterns. Concepts illustrated through comparative studies of selected world cultures. Prereq: Junior standing. F, S

411 Food and World Cultures

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

450 Interior Design V — Lecture 3 Advanced exploration of design theory and process; emphasis on personal and environmental interaction. Prereq: ADFH 352, 353. Coreq: ADFH 451.F

451 Interior Design V — Studio Advanced application of design theory and process. Prereq: ADFH 352, 353. Coreq: ADFH 450. F

452 Comprehensive Interior Design Project 6 Capstone design studio. Student defined problem. Synthesis and implementation of previous course work. Prereq: Departmental approval. Coreq: ADFH 460. S

455/655 Advanced Apparel Assembly 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 or instructor approval.

460 Professional Practice

3 Overview of professional standards and promotional activities as related to the interior design profession. Prereq: ADFH 450, 451. Coreq: ADFH 452.S

465/665 Textile Product Analysis 3 Analysis of fiber, yarn, and fabric properties that

affect textile product performance. Application of analysis techniques and results to specification development for textile products. Prereq: ADFH 366, 367. S

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467 [F&N] Hospitality Law

Legal considerations of hospitality property management and exploration of important legislation. Legal rights, liabilities and responsibilities of the operator in conjunction with management policies. F

470/670 Retail Financial Management and Control

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 higher, BUSN 360 or 362. S

479 [F&N] Hospitality Industry Management Strategies

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 381, Senior standing. S

480 Facility Design and Management

Understanding facilities and their components; mastering techniques and procedures for analyzing, planning, designing, constructing, programming, specifying furnishings, and equipping facilities. Prereq:ADFH 161, 252, 253. F (odd years)

481 Apparel and Textiles Capstone Experience

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

482 Facility Management Capstone Experience

Facility Management capstone experience focusing 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 252, 253, 380, Senior standing. S

486/686 Dress and Human Behavior

Influence of dress and appearance on human behavior throughout the life cycle. Prereq: PSYC 111 or SOC 110. F

ARCHITECTURE (ARCH)

Gleye, Chair; Booker, d'Anjou, Dougan, Elnahas, Faulkner, Hatlen, Mahalingam, Martens, Ramsay, Urness

COURSES

132 Architectural Graphics

Introduction to freehand and instrument-based drawing techniques used in architecture and landscape architecture. Includes graphic techniques required for rendering shades, shadows, and perspectives. Various media will be used including grayscale and color drawings. Prereq:ARCH 171.

171 Environmental Design I

Introduction to the environmental design fields of planning, urban design, landscape architecture, architecture, and interior design. Particular attention is given to basic design concepts, visualization, visual analysis, imagination, and creativity. Lecture course. Cross-listed with LA.

172 Environmental Design II

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Introduction to the vocabulary, history, theory, technology, design process, and tools used in architecture and landscape architecture. Lecture course. Prereq:ARCH 171. Cross-listed with LA.

271, 272 Architectural Design I, II 4 each

Studio courses focused on exercises in basic design incorporating abstract two-dimensional design, functional response to environmental determinants, the articulation of form, spatial organization, and aesthetic judgment. Prereq for 271: ARCH 132, 172. Prereq for 272:ARCH 271.

321 History of Architecture I

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

History of architecture from the Baroque to the present placing within a global perspective. Lecture course.

326 Design Process and Methods

Study of the methodology, procedure, and theory of architectural design. Lecture course. Prereq: ARCH or LA 271.

341 Architectural Structures I

Overview of the principles of statics and mechanics of materials and structural concepts relative to building members and frames. Prereq: ARCH 272, two MATH courses (103 and higher), PHYS 120.

342 Architectural Structures II

Basic qualitative and quantitative concepts of structural behavior of building frames. Includes methods in the design of elementary frames and member design of steel, concrete, and masonry structural systems and methods of connection. Prereq:ARCH 341.

351 Materials and Construction

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.

352 Environmental Control Systems I

Study of architectural design related to thermal comfort, climate, passive and active solar systems, day-lighting, illumination, and other environmental concerns. Prereq: ARCH 371, two MATH courses (103 and higher), PHYS 120.

371, 372 Architectural Design III, IV 4 each

Studio courses providing intermediate level exercises in architectural design; responding to contextual, cultural, environmental, climatic, technological, and aesthetic determinants. Prereq: ARCH 272, 371 respectively.

451 Environmental Control Systems II

Study of the fundamentals of life safety systems 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 352, 372, MATH 105, PHYS 120.

452 Construction Detailing

Graphic study of wood, steel, masonry, and concrete construction assemblies through architectural

detailing with an introduction to specifications and construction documents. Prereq:ARCH 471.

461 Urban Design

Study of urban form and urban theory, development, and processes in a historic and contemporary context. Prereq: Junior standing or departmental approval. Coreq for majors:ARCH 471.

471, 472 Advanced Architectural Design I, II

Design I, II 5 each Studio courses involving the complex organization of architectural spaces and forms in an urban context. Prereq:ARCH 372, 471 respectively.

521-528 History/Theory Seminars

These courses are offered on an occasional, rotating basis. Prereq: Departmental approval. Prereq for majors:ARCH 471.

521 Non-Western Traditions

Advanced seminar on the investigation of design methods and building traditions of non-Western cultures and diverse geographic regions.

522 Urbanism

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Advanced seminar to explore in-depth aspects of current urban design.

523 Preservation

Advanced seminar to explore the philosophy and techniques of architectural preservation.

524 Technology

Advanced seminar to explore the historical and theoretical underpinnings of architectural technology.

525 Post World War II

Advanced seminar to explore the major architectural movements and personalities in architecture and design since World War II.

526 Current Theory

Advanced seminar focused on the work and design theory of leading living architectural practitioners around the world.

527 Vernacular Traditions

Advanced seminar to explore the vernacular design traditions in North America and elsewhere.

528 Socio-Cultural Issues

Advanced seminar focused on the social issues and movements that have influenced environmental design.

561 Architecture Programming

Discussion and application of a comprehensive design process for production of the capstone design project. Emphasis on preparing a design program. Coreq:ARCH 571. Cross-listed with LA.

571 Advanced Architectural Design III 6 Studio course involving complex design problems requiring increased self-direction. Prereq: ARCH 472. Coreq:ARCH 561.

572 Advanced Architectural Design IV 8

Studio course devoted to the execution of a capstone thesis project from schematic design through design development, presentation, and review. Prereq:ARCH 571.

114 Course Descriptions

582 Professional Practice

Study of contemporary practice covering professional development, firm organization, and project management within the context of the ethical, legal, and regulatory environment. Prereq: ARCH 472.

589 Professional Seminar

Various topics related to theoretical or methodological aspects of architecture. Prereq:ARCH 472, fifth-year standing in the department.

ART (ART)

Bromley, Kapplinger, Swan, Swenson

COURSES

110 Introduction to the Visual Arts (CCN) 3 Study and analysis of artistic methods and meaning in the visual arts; designed for non-majors. (ND:HUM)

111 Introduction to Art History 3 Survey of world art from prehistoric to modern times designed for non-majors.

120 [220] Painting I (CCN)

Introduction to basic painting through a variety of materials. Includes historical examples, painting the human figure, using acrylics, oils, pastels, and mixed-media.

122 Two-Dimensional Design (CCN) 3 Basic study of two-dimensional design for the studio artist.

124 Three-Dimensional Design (CCN) 3 Basic study of three-dimensional design for the studio artist.

130 Drawing I (CCN)

Study and application of different drawing media, methods, and techniques. Drawing from the human figure required.

150 [250] Ceramics I

Introduction to basic ceramic techniques. Includes wheel-throwing and hand-building techniques, surface decoration, glazing, and firing.

160 [265] Sculpture I

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.

170 [270] Printmaking I 3 Introduction to basic printmaking techniques and materials. Includes mono-print, collagraph, intaglio, relief, and serigraphy in both traditional and nontoxic methods.

180 [280] Photography I 3 Introduction to basic photography. Includes visual issues of black and white and color photography. Experience with black and white processing and printing.

185 [275] Digital Media

Introduction to basic visual arts techniques and applications using computers, tablets, and other digital media.

210, 211 Art History I, II (CCN)

Intensive survey of art from Paleolithic to the Renaissance and from the Renaissance to the present. (ND:HUM)

220 [362] Painting II

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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.

230 [361] Drawing II (CCN) 3 Advanced study and application of different drawing media, methods, techniques and drawing the human figure. Prereq:ART 130.

250 [365] Ceramics II

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.

260 [366] Sculpture II

Intermediate study, practice, and critique. Further exploration of materials and processes. Development of individual concept and content. Prereq:ART 160.

270 [363] Printmaking II

Intermediate study, studio practice, and critique. Extension of process and media. Development of individual concept and content. Prereq:ART 170.

280 [364] Photography II

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.

285 Digital Media II

Intermediate study, studio practice and critique in digital media. Extension and exploration of computer applications of value to the studio artist. Prereq:ART 185.

320 [462] Painting III

Advanced study, studio practice, and critique. Exploration of mixed-media. Emphasis on individual concept and content. Prereq:ART 220.

330 [461] Drawing III

Advanced study, studio practice, and critique. Use of mixed-media approaches. Emphasis on individual concept and content. Life drawing emphasis. Prereq:ART 230.

335 Figure Drawing

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.

350 [465] Ceramics III

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.

360 [466] Sculpture III

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Advanced study, practice, and critique. Use of mixed-media. Specialization in materials and processes. Emphasis on individual concept and content. Prereq:ART 260.

370 [463] Printmaking III

Advanced study, studio practice, the human figure, and critique. Exploration of mixed-media. Emphasis on individual concept and content. Prereq:ART 270.

380 [464] Photography III

Advanced study, studio practice, and critique. Professional practice, promotion, and presentation. Emphasis on individual concept and content. Prereq:ART 280.

385 Digital Media III

Advanced study, studio practice and critique in digital media. Exploring computer studio potential of 2-, 3-, and 4-dimensional applications. Prereq: ART 285.

420 Painting IV

Advanced study, studio practice and critique in painting. Exploration and development of an individual concept. May be repeated. Prereq:ART 320.

430 Drawing IV

Advanced study, studio practice and critique in drawing. Exploration in individual concept, process and professional preparation. May be repeated. Prereq:ART 330.

435 Advanced Figure Drawing

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.

450 Ceramics IV

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.

451 History of American Art

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.

452 Contemporary Art

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.

453 Topics in Art History

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.

460 Sculpture IV

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.

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470 Printmaking IV

Advanced study, studio practice and critique in printmaking. Exploration in printmaking of individual concept, process and professional preparation. May be repeated. Prereq: ART 370.

480 Photography IV

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

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 [499] Baccalaureate Project

Capstone research and creative experience within a specific area of interest with emphasis on refinement of aesthetic applications of techniques and media.

ATHLETICS (ATHL)

COURSES

111 Activity I 1 Basic techniques and practice of fitness activities.

116 Weight Training

Basic techniques and practice of weight training.

118 Fall Semester First-Year

Intercollegiate Sports First-year participation on an intercollegiate sports team.

123 Spring Semester First-Year

Intercollegiate Sports

First-year participation on an intercollegiate sports team.

213 Fall Semester Second-Year

sports team.

Intercollegiate Sports Second-year participation on an intercollegiate

223 Spring Semester Second-Year

Intercollegiate Sports 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

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

Fifth-year participation on an intercollegiate sports team.

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434 Spring Semester Fifth-Year Intercollegiate Sports

Fifth-year participation on an intercollegiate sports team.

BIOCHEMISTRY (BIOC)

Killilea, Meinhardt, Sparks, Srivastava

COURSES

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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. Prereq: CHEM 117 or 122, 140. Recommended: CHEM 240. Also listed under CHEM

460 Foundations of Biochemistry and Molecular Biology I

Rigorous treatment of biomolecules, generation and use of metabolic energy, biosynthesis, metabolic regulation; storage, transmission, and expression of genetic information. 3 lectures, 1 one-hour discussion, 1 three-hour laboratory. Prereq: CHEM 240 or 342.

461 Foundations of Biochemistry and Molecular Biology II

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. Prereq: BIOC 460.

465/665 Principles of Physical Chemistry and **Biophysics**

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. Prereq: MATH 147, PHYS 212. 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. Prereq: BIOC 461. Coreq for 673: BIOC 701.

474/674 Methods of Recombinant DNA Technology

Principles and techniques of recombinant DNA construction, gene cloning, and analysis of gene structure. 1 lecture, 2 three-hour laboratories. Prereq: BIOC 461. 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. Prereq: BIOC 460.

483/683 [718] Cellular Signal Transduction **Processes and Metabolic Regulation**

Advanced topics in regulation of metabolic processes including signal transduction, reversible and irreversible covalent modification hormonal effects, protein turnover, and related phenomena. 2 lectures. Prereq for 683: BIOC 702. F (alternate vears)

485/685 Industrial Biotechnology

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. Prereq: BIOC 460 or 702, MICR 350.S

487 Molecular Biology of Gene Expression This is an advanced undergraduate course de-

signed to analyze current information regarding biochemistry and molecular biology of gene expression and regulation in prokaryoates, eukaryoates and archea, with primary emphasis on eukaryotic systems.

701, 702 Comprehensive

4 each

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Biochemistry I, II Comprehensive treatment of the chemistry and biochemistry of proteins, nucleic acids, carbohydrates, lipids, vitamins, hormones, and the specific metabolism of these substances. 4 lectures. Prereq: CHEM 342, BIOC 701 respectively.

716 Protein and Enzyme Biochemistry

Advanced topics in protein properties and structure, and the influence of these factors on enzyme kinetics and mechanism. 3 lectures. Prereq: BIOC 702. S (alternate years)

717 Carbohydrate/Lipid Biochemistry

Advanced topics in the structure, reactions, biosynthesis, and properties of carbohydrate and lipid materials of plant and animal origin. 3 lectures. Prereq: BIOC 702. S (alternate years)

719 Molecular Biology of Gene

Expression and Regulation

Advanced topics in molecular biology and regulation in prokaryotes, eukaryotes, and archaea; early events in developmental gene expression. 3 lectures. Prereq: BIOC 702. F (alternate years)

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721 Genomics Techniques See Plant Sciences for description.

BIOLOGICAL SCIENCES (BIOL)

Bleier, Chair; Anderson, Barker, Butler, Clambey, Clark, Esslinger, Fawley, Gerst, Grier, Hutchison, Kenyon, Montplaisir, Nuechterlein, Olson, Reed, Sheridan, Stewart, Stockwell, White

COURSES

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Biology (BIOL)

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.

124, 124L Environmental Science.

Lab (CCN) 3.1 Ecological principles related to human cultures, resource use, and environmental alterations. (ND:SCD)

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 [ZOO 120, 120L] 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)

221, 221L Human Anatomy and

Physiology II, Lab (CCN) 3,1 A continuation of BIOL 220, 220L; the endocrine, cardiovascular, lymphatic, immune, respiratory, digestive, urinary, and reproductive systems and development. S

310L Methods in Cell and Molecular Biology 3 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.

315, 315L Genetics, Lab (CCN)	3,1
See Plant Sciences for description.	

364 General Ecology 3 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.

435 [MICR] Hematology

A survey of the biology and physiology of blood and blood forming organs. Identification of normal and abnormal blood cells in various hematological disorders will be included. Prereq: BIOL 202L or MICR 350L.

440/640 Biotechnology and Ethics

Study of ethical issues associated with the development of emerging technologies and their application in solving biological problems. Prereq: BIOL 150 or Junior standing.

459/659 Evolution

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.

705 Teaching College Science

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.

750 Advanced Ecology

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.

776 [ZOO] Population Dynamics

Principles and mechanics of animal population dynamics. Prereq: BIOL 364 and an interest in working with numbers. S (odd years)

784 [ZOO] Biological Research Principles

Discussion, analysis of published research papers, lectures on selected topics, and student research proposal. Prereq: STAT 725 or 330 and 331.

785 [BOT 784] Photobiology

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 or instructor approval.

BOTANY (BOT)

314 Systematic Botany 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.

315, 315L Genetics, Lab See Plant Sciences for description.

372 Structure and Diversity of Plants and Fungi

See department for description.

380 Plant Physiology

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 151, 151L.

380L Plant Physiology Lab

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Optional laboratory course accompanying BOT 380. Molecular, biochemical, and physiological techniques will be used to address contemporary problems in plant physiology. Coreq: BOT 380

431/631 Intermediate Genetics

See Plant Sciences for description.

450/650 Range Plants

See Animal and Range Sciences for description.

452/652 Plant Structure

Study of the development and structure of cells, tissues, and organs of vascular plants. 2 lectures, 1 laboratory. F (even years)

460/660 Plant Ecology

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.

471/671 Phycology

Identification, systematics, evolution, ecology, life histories, physiology, cytology, and culture of algae. Prereq: BIOL 151, 151L.

Prereq: BIOL 151, 151L.	
716 Agrostology See Animal and Range Sciences for description.	3
717 Aquatic Vascular Plants	2

Biology, ecology, and systematics of lichen fungi.

71 See Animal and Range Sciences for description.

472/672 Lichenology

720 Advanced Cell Biology 3

In-depth survey of cell biology, including studies of membranes, secretion cytoskeleton, cellular movement organelles, and gene regulation. Prereq: BIOC 702.

762 Environment and Adaptation 3

Environmental factors and responses evidenced with life-history patterns, genetic variation, population dynamics, species-interactions, and physiological processes. Prereq: BIOL 364.

764 Ecological Processes

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.

780 Plant Metabolism and Plant Stress Physiology A detailed study of the dynamics, compartmenta-

tion, 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.

782 Regulation of Plant Growth 4

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.

Zoology (ZOO)

126, 126L Human Biology, Lab 3,1 See Biological Sciences (Biology) for description. Does not count toward major or minor.

280 Comparative Chordate Morphology

Introduction to the systematics, history, and structure of chordates, especially the vertebrates. Prereq: BIOL 151, 151L.S

315, 315L Genetics, Lab

3,1 See Plant Sciences for description.

360 Animal Behavior

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 (even years)

364 General Ecology

See Biological Sciences (Biology) for description.

370 Cell Biology

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.

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380 Vertebrate Histology

Study of the microscopic anatomy of vertebrate tissues and organs, especially mammals. Prereq: BIOL 151, 151L. S (odd years)

431/631 Intermediate Genetics

See Plant Sciences for description.

440/640 Microbial Ecology

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.

450/650 Invertebrate Zoology

Survey of the biology, classification, and evolution of invertebrates. Emphasis on major phyla, marine, and parasitic taxa. Prereq: BIOL 151, 151L. S

452/652 Ichthyology

Biology and taxonomy of fishes. Prereq: BIOL 151, 151L. F (even years)

454/654 Herpetology

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)

456/656 Ornithology

Introduction to the biology, classification, and identification of birds, especially local forms. Early morning field trips required. Prereq: BIOL 151, 151L. F

458/658 Mammalogy

Biology and taxonomy of mammals. Prereq: BIOL 151, 151L. F

460/660 Animal Physiology

Development of basic quantitative descriptions of physical and chemical principles governing cell and organ function. Prereq: BIOL 151, 151L, CHEM 341. F

462/662 Physiological Ecology

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. S

463/663 Physiology of Reproduction

See Animal and Range Sciences for description.

464/664 Endocrinology

Physiology and anatomy of endocrine glands; chemistry and interrelations of their secretions. Prereq: BIOL 151, 151L. F/2 (odd years)

470/670 Limnology

Biological, physical, and chemical features of freshwater ecosystems. Prereq: BIOL 151, 151L, 364, one year chemistry. F/2 (odd years)

472/672 Fisheries Biology

Principles of ecology and limnology applied to fish production. Prereq: BIOL 364. S/2 (odd years)

474/674 Fisheries Management

Techniques used in the study and management of fish. Prereq: ZOO 472. S/2 (even years)

475/675 Conservation Biology

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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

476/676 Wildlife Ecology and Management

Application of ecological principles to management of game and non-game wildlife populations. Field trips required. Prereq: BIOL 364. S

477/677 Wildlife and Fisheries Management Techniques

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. Prereq: ZOO 476.

482/682 Developmental Biology

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)

720 Advanced Cell Biology

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.

750 Advanced Conservation Biology

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 311, 312, 364, 675.

760 Evolutionary Ecology

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)

764 Neuroendocrine and Endocrine Systems 3 Topics in molecular endocrinology. Emphasis on signal transduction and effects of hormones on gene expression. Prereq: ZOO 464. S/2 (even years)

770 Aquatic Community Ecology

Nature and ecological roles of the freshwater biota. Discussion of contemporary issues in aquatic ecology. Prereq: ZOO 470. F/2 (even years)

BUSINESS ADMINISTRATION (BUSN)

Leitch, chair; Bahrami, Bitzan, Brown, Elder, Froelich, Garrison, Jones, Jung, Kim, Macintosh, Martin, Ramaya, Rymph, Simmons, Stevens, Szmerekovsky, Traub, Walker

COURSES

(All courses 300 level and above require a minimum of Junior standing and a 2.50 cumulative GPA).

310 International Business

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.

318 Taxation in Management Decisions3See Accounting for description.

340 Principles of Finance

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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.

347 Principles of Real Estate

See Agricultural Economics for description.

350 Foundations of Management

Study of the major functional areas of management including an international perspective of management. Prereq: PSYC 111.

351 Foundations of Organizational Behavior 3

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.

352 Operations Management

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.

360 Foundations of Marketing

Survey of the four basic areas of marketing: product, price, place, and promotion. Exposure to consumer behavior and strategic marketing from an international perspective.

361 Marketing Management

Focus on analysis, planning, implementation, and control of worldwide marketing programs for the purpose of achieving an organization's objectives. Prereq: BUSN 360.

362 Foundations of Retailing

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.

372 Global Retailing 3

See Apparel, Design, Facility and Hospitality Management for description.

374 Cooperatives

See Agricultural Economics for description.

413 Business Internship

Supervised professional experience with an appropriate public or private business. Students must meet standards established by the employer and the College of Business Administration.

415 [495] Small Business Institute

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. Prereq: Instructor approval.

430/630 Legal and Social Environment of Business

Study of legal and regulatory environment in which business firms operate, as well as the social environment. Includes business ethics and social responsibility issues.

431 Business Law I – Contracts, Property and Torts 3

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.

432/632 Business Law II – Business

Organizations and Commercial Transactions 3 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.

435/635 International Business Law

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.

436/636 Law of Electronic Commerce 3 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.

441/641 Investment Analysis and Management

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.

442/642 Speculative Markets3Evaluation of options, futures, and other derivativesecurities used for hedging, speculation, and arbitrage. Related market structure, trading strategies,and risks are examined. Prereq: BUSN 441/641 or444/644.

443/643 Management of Financial Institutions

Development, role, and functions of depository financial institutions. Emphasis on domestic and international regulation, structure, management, and operations of commercial banks. Prereq: BUSN 340.

444/644 Money and Capital Markets 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.

445/645 International Finance 3 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.

450/650 Human Resource Management

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 is addressed. Prereq: BUSN 350.

451 Managerial Economics

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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.

452/652 Compensation Management

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.

453 Understanding and Managing Diversity in Organizations

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.

454/654 International Management

Focused on management challenges associated with business activity across national boundaries. Development of management skills for global contexts. Prereq: BUSN 350.

455/655 Labor Relations and Alternative Dispute Resolution

Examines the impact of the law on labor-management from a historical and current perspective. Focuses on the preparation and issues involved in the negotiation process, and the various forms of mediation and arbitration. Prereq: BUSN 350.

456 Entrepreneurship/Small Business Management

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.

457 Leadership in Organizations

A comprehensive study of the principles, practices, and challenges of contemporary leadership and followership. Prereq: BUSN 350.

460/660 Consumer Behavior

Examination of dimensions of consumer buying theories. Aimed at understanding the buying behavior of customers. Prereq: BUSN 360.

461/661 Advertising and Integrated Marketing Communication

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.

462/662 Sales and Sales Force Management

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Examination of different aspects of effective personal selling with focus on decision areas pertaining to sales force management. Prereq: BUSN 360.

463/663 [761] Marketing Research3Study of research methods with focus on researchdesign, data collection, and analysis techniques.Prereq: BUSN 360, STAT 330, 331.

464/664 International Marketing 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.

465 Marketing Strategy 3

The analysis, planning, implementation, and control 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.

466/666 Services Marketing

This course focuses on management and strategic issues as they relate to the marketing of services. Prereq: BUSN 360.

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481 Supply Chain Management

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.

483/683 Organizational Communication3See Communication for description.

486 Senior Thesis

Directed development of a paper showing the application, synthesis, and integration of business concepts. Prereq: Instructor approval.

489 Strategic Management 4

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.

740 Advanced Financial Management 3 In-depth coverage of concepts and decisionmaking tools in financial analysis, cost of capital, capital structure, capital budgeting, and dividend policy. Emphasis on risk analysis, international per-

spectives, and current topics in corporate finance.

Prereq: BUSN 340.

750 Advanced Organizational Behavior 3 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.

751 Advanced Operations Management 3

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.

760 Strategic Marketing Management

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.

780 Business Conditions Analysis

Preparation of students to analyze domestic and global economic factors that impact the U.S. and world economy. Prereq: BUSN 760.

789 Business Policy and Strategy

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: Doehlert, Grant, Hareland

COURSES

210 Introduction to Food Science and Technology

Overview of food components, food quality, nutrition, processing, packaging, safety, sanitation laws, sensory evaluation, distribution, and utilization.

430/630 Food Unit Operations

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

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

Discussion of cereal grains, their properties, evaluation, and utilization.

452/652 Food Laws and Regulations	
See Food Safety for description.	

453/653 Food and Dairy Microbiology See Microbiology for description.

460/660 Food Chemistry

Study of food components including water, carbohydrates, lipids, proteins, vitamins, minerals, and enzymes. Prereq: CFS 210, CHEM 341, 341L, BIOC 460.

461/661 Food Chemistry Laboratory

Laboratory isolation, observation of characteristics, and quantitation of food components. Coreq: CFS 460/660.

464/664 Food Analysis

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

Capstone course integrating principles of food chemistry, food microbiology, food engineering, nutrition, statistics, and sensory evaluation through the discussion of food processing operations. Prereq: CFS 450, 460, or departmental approval.

471/671 Food Processing Laboratory

Field trips, experiments on freezing, freeze-drying, spray drying, canning, beverage production, water activity measurements, shelf life, and quality control. Coreq: CFS 470/670.

725 Food Policy

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See Food Safety for description.

752 Advanced Food Microbiology See Food Safety for description.

758 Fundamentals of Flour Testing and Baking

Flour testing, industrial, and experimental bread baking. Production methods, ingredients, and baking reactions. Lectures and laboratories. Prereq: CFS 450/650.

759 Milling

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

Durum wheat quality, pasta production, and pasta quality evaluation. Lectures and laboratories. Prereq: CFS 450/650.

761 Malting and Brewing Barley and malt quality; malting and brewing. Lectures and laboratories. Prereq: CFS 450/650.

764 Cereal Carbohydrates

Carbohydrates (monosaccharides, oligosaccarides, 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 lipids. Biochemical aspects of these components will also be presented. Prereq: BIOC 701.

766 Advanced Cereal and Food Chemistry II 4 Physiochemical, structural, and functional properties of cereal and food proteins and the biochemical characteristics of enzymes in food systems. Includes content from former CFS 767. Prereq: BIOC 701.

CHEMISTRY (CHEM)

Hershberger, Chair; Campiglia, Cook, Eaton, Garvey, Hamilton, Jacobson, Mallik, McCarthy, 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. Prereq: MATH 103 or equivalent. (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. Coreq: MATH 103. (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. Prereq: CHEM 121, 121L. (ND:LABSC)

140 Organic Chemical Concepts and Applications (CCN)

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. Prereq: 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. Prereq: 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. Prereq: CHEM 122, 122L.

342, 342L Organic Chemistry II, Lab (CCN) 3,1 Structure and reactivity, named reactions, carboncarbon bond forming reactions, aromatic and heterocyclic chemistry, biomolecules and polymers, and multi-step synthesis. Prereq: 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. 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. 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. Prereq for 364: CHEM 151, MATH 265, PHYS 252. Coreq for 364: MATH 266. Prereq for 365: CHEM 364.

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380 Chemistry Junior Seminar

Includes discussion of chemistry topics, technical writing instruction and assignments; participation in senior seminar discussions.

425/625 Inorganic Chemistry I Electronic structure, ionic and covalent structure and bonding, point groups and symmetry, coordination chemistry, acid-base and redox chemistry. Prereq: CHEM 364.

426/626 Crystallography/Crystal Chemistry 2 Geometric and space group crystallography. Structure and bonding in common minerals and industrially important solids. Structure-property relationships. Half semester.

427/627 X-Ray Diffraction 2 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.

428/628 Geochemistry See Geology for description.

429 Inorganic Chemistry Laboratory

Methods of synthesis and characterization of inorganic and organometallic compounds. Capstone laboratory experience for ACS certified chemistry majors. Coreq: CHEM 425.

431, 431L Analytical Chemistry I, Lab 3,2 Chemical equilibrium and its analytical applications; introduction to chromatography and potentiometry. Prereq: CHEM 122, 122L or 151, 161.

432/632, 432L/632L Analytical

Chemistry II, Lab 3,1 Theory and application of modern instrumental techniques, including spectroscopy and electrochemistry. Prereq: CHEM 431, 431L.

435/635 Chemical History 2 Survey of the history of the chemical sciences from the stone-age through the early 1900's. Prereq: CHEM 341 or instructor approval.

471 Physical Chemistry Laboratory 2 Measurement of thermodynamic and spectroscopic properties of chemical substances, analysis of data. Prereq: CHEM 364.

486/686 Corrosion and Its Control

by Coatings

See Coatings and Polymeric Materials for description.

724 Chemical Applications of Group Theory 1 See department for description.

725 Inorganic Chemistry II

Molecular orbital and valence bond theories, inorganic reactions and mechanisms. Prereq: CHEM 425.

726 Photochemistry and Photophysics 2 Principles underlying the photophysics and photochemical reactivity of organic, coordination, and organometallic compounds. Introduction to photochemical and photophysical experimental

techniques. Prereq: CHEM 625, 724, or instructor approval.

727 Organometallic Chemistry

Synthesis, reactivity, and bonding in organometallic compounds. Half semester. Prereq: CHEM 725.

728 Physical Methods in Inorganic Chemistry 2

Physical methodology especially appropriate to the characterization of inorganic and organometallic compounds. Includes electronic, vibrational absorption, electronic spin resonance, Mössbauer spectroscopy and nuclear magnetic resonance methods. Prereq: CHEM 725.

729 X-Ray Structure Determination

Use of single crystal X-ray diffraction data to determine molecular and crystal structures. Half semester. Prereq: CHEM 626 or 627.

730 Separations

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Theory of equilibrium chemistry in aqueous and nonaqueous systems; principles of chromatographic and other separation techniques. Prereq: CHEM 432/632.

732 Electrochemistry

Theory and application of modern electrochemical methods, including potentiometry, voltammetry, electrochemical impedance spectroscopy, kinetics and mechanisms of electrode processes, corrosion, simulation techniques, and instrumentation. Prereq: CHEM 432/632.

734 Instrumentation Electronics

Design and operation of digital and analog circuits used in chemical instrumentation, computer interfacing. Includes laboratory. Prereq: CHEM 432/632.

736 Mass Spectrometry

Theory and application of mass spectrometry in analysis, tandem mass spectrometry, ionization techniques. Half semester. Prereq: CHEM 432/632.

737 Gas Phase Ion Chemistry

Principles and applications of gas phase ion techniques to the study of the chemical and physical properties of reactive intermediates. Half semester. Prereq: CHEM 736.

741 Physical Organic Chemistry I

Principles governing the reactivity of organic compounds and methods for determining reaction mechanisms.

742 Physical Organic Chemistry II 2 Aromaticity, electrophilic substitution, Woodward-Hoffman rules. Half semester. Prereq: CHEM 741.

743 Reactive Intermediates Radicals, carbenes, nitrenes, arynes, carbenium ions, survey of other reactive intermediates. Half semester. Prereq: CHEM 741.

744 Organic Spectroscopy 2 Structure elucidation by spectrometric methods, including infrared, mass spectrometry, UV, and nuclear magnetic resonance. Interpretation of 2-D NMR spectra. Half semester.

745 Organic Synthesis

Functional group synthesis, synthetic design, stereochemical control. Prereq: CHEM 741.

746 Advanced NMR Spectrometry

Theory of pulsed FT-NMR, instrumentation, pulse sequences (with emphasis on multipulse experiments), two-dimensional NMR and applications. Half semester. Prereq: CHEM 744.

754 Organic Spectroscopy Laboratory I Laboratory to accompany 744, with emphasis on NMR techniques. Half semester. Coreq: CHEM 744.

759 Intermediate Physical Chemistry 3 Fundamental principles of physical chemistry including quantum chemistry, spectroscopy, molecular thermodynamics, and kinetics.

760 Statistical Thermodynamics Macroscopic and microscopic models for the study of equilibrium properties of pure phases

761 Optical Spectroscopy

and solutions. Prereq: CHEM 365.

Theory and practice of modern spectroscopic methods. Emphasis on visible and ultraviolet wavelength ranges. Half semester. Prereq: CHEM 632.

763 Kinetics

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2 Experimental methods to determine reaction rates, empirical rate laws, transition state theory. Half semester. Prereq: CHEM 365.

764 Dynamics

Chemical physics of energy transfer and reactive collisions. Half semester. Prereq: CHEM 763.

766 Quantum Chemistry I

Wave functions and their properties, quantum mechanical behavior of atoms and molecules. Prereq: CHEM 365.

767 Quantum Chemistry II

Ab initio and semi-empirical methods for the calculation of energetic and structural properties of molecules; computational methods. Half semester. Prereq: CHEM 766.

CHILD DEVELOPMENT AND FAMILY SCIENCE (CDFS)

Deal, Head; Bartoszuk, Bretteli, Brotherson, Duggan, Erickson, Fitzgerald, Habedank, Hektner, Kaler, Light, McGeorge, Panlaow, Randall, Sanders, Stone-Carlson, Werlinger

COURSES

135 Family Science 3 Introduction to family science concepts including family life cycle, different styles of family life, and the influence of society on the family.

182 Wellness and Aging

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.

186 Consumer and Society

Consumer rights, responsibilities, and consequences of consumer decision-making. Overview of advertising, fraud, and other issues.

230 Life Span Development

Study of human growth and development throughout the life span.

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242 Couples, Marriages, and Families

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.

320 [232] Prenatal, Infant and Toddler Development

A functional approach to the study of growth and development of the infant during the first two years of life.

330 Child Development

Study of children, birth through middle childhood. Emphasis on social, cognitive, physical, and emotional development. Prereq: CDFS 230, 320, or PSYC 250.

341 Parent-Child Relations

Contemporary parenting principles and strategies. Emphasis on application in the home and professional settings. Prereq: CDFS 230, PSYC 250, or instructor approval.

353 Children, Families, and Public Policy

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.

357 Personal and Family Finance

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.

371 Guidance and Curriculum in Preschool Programs

Examination of philosophies, curriculum models, and guidance techniques in the field of childhood care and education, including sensitivity to cultural diversity. Prereq: CDFS 230, 330.

381 Creative Activities for Children

Study of developmentally appropriate activities for infants, toddlers, and preschoolers. Prereq: CDFS 320, 330. Coreq: CDFS 382.

382 Implementing Creative Activities for Children

Supervised implementation and evaluation of developmentally appropriate activities for infants, toddler, and preschoolers. Prereq: CDFS 320, 330. Coreq: CDFS 381.

403 Introduction to Research Methods in Child **Development & Family Sciences**

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 or Senior standing.

424/624 Observation and Assessment of Children

Overview of observation/assessment of children for research and practice application. Prereq: CDFS 320, 330.

425/625 Children and Stress

Survey of theory and research relating to children's reactions to stress and coping, infancy through adolescence. Examination of strategies for working with children, including topics on children's reactions to divorce, sibling death, and hospitalized children. Prereq: CDFS 320, 330, or instructor approval.

448/648 Issues in Sexuality

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Study of personal, interpersonal, and societal meanings of human sexuality. Decision making relevant to sexual behavior. Prereq: 6 credits social science.

450/650 Adolescent Development

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.

460/660 Adult Development and Aging

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.

462/662 Family Crisis

Effects of crisis-producing situations on adjustment within the family. Intervention strategies. Prereq: CDFS 135, 242, Junior or Senior standing.

468/668 Families and Work

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.

471 Program Administration and **Professional Relations**

Overview of policies, strategies, and skills involved in administration of early childhood programs. Includes parent-professional relations. Prereq: CDFS 230, 330, 371, 381. Recommended: CDFS 341.

475/675 Children and Families Across Cultures

Study of developmental and family issues as viewed from a cross-cultural diversity perspective.

477/677 Financial Counseling

Advanced analysis of family financial issues. Evaluation of alternative financial programs. Prereq: 6 credits social science. Recommended: CDFS 357.

478/678 Financial and Consumer **Issues of Aging**

Integration of economic and consumer problems of the elderly including income trends in retirement and health care. Prereq: 6 credits social science.

480/680 Learning and Cognition in Children 3 Study of developmental research and theoretical approaches to learning and cognitive development in children from birth through adolescence. Prereq: CDFS 230, 330.

481/681 Women and Aging

Study of theory, research, and application of issues related to women and the aging experience. Prereq: CDFS 460.

482/682 Family Dynamics of Aging

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.

483/683 Family Wellness

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Principles and theories of family wellness/enrichment. Includes study of preventive and enrichment programs for couples and families. Prereq: CDFS 135, 242, Junior or Senior standing.

485 Capstone Experience in CDFS

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.

486/686 Children in Social Contexts

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.

487 Practicum in Child Development Programs

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.

488/688 Exceptional Child and Family 3 Study of children and their families who vary from the norm in development and functioning. Prereq: CDFS 230,6 credits social science.

701 Graduate Orientation Seminar 1 Introduction to graduate program, faculty, policies and procedures.

703 Research Methods in Child **Development and Family Science**

3 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.

722 Applied Research in Gerontology

Study of research in applied social gerontology. The course will explore quantitative and qualitative approaches to studying older persons and related systems.

760 Aging Policy

Formation, implementation and impact of policies that affect the well-being of the elderly in the United States.

761 Applications in Gerontology

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.

762 Retirement Planning, Employee Benefits and the Family

Critical examination of micro and macro considerations in retirement planning for individuals and families.

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763 Personal Income Taxation

Study of principles and concepts of personal income tax planning as they relate to families.

764 Family Economics

Overview of basic concepts and theories in family economics with emphasis on the economics situation of families in the United States.

765 Insurance Planning for Families

An in-depth study of risk management concepts, tools, and strategies for individuals and families.

766 Estate Planning for Families

Study of principles and concepts of estate planning as they relate to families.

767 Professional Practices in

Family Financial Planning3Study of strategies and methods for managing private family financial planning practices including ethics, compensation, client-centered marketing and practice management.

768 Housing/Real Estate

Overview of the role of housing and real estate in the family financial planning process including taxation, law, mortgages, ethics and financial calculations.

769 Financial Planning Case Studies 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.

770 Fundamentals of Financial Planning 3 Survey of personal/family financial planning including process, time value of money, cash management, credit, taxation, insurance, housing, investments, retirement, and estate planning.

771 Investing for the Family's Future

Study of the concepts of time and risk value of money in evaluating investment markets.

773 Foundations of Marital and

Family Therapy I 3 Introduction to theoretical foundations of marital and family therapy and the historical and contemporary development of the field.

774 Foundations of Marital and Family Therapy II

Study of critical epistemological issues in the field of marriage and family as they relate to contemporary models in the practice of therapy.

775 Clinical Applications in Marital

and Family Therapy I 3 In-depth study of current approaches to family therapy. Emphasis on contextual, structural, and strategic approaches.

776 Clinical Applications in Marital and Family Therapy II

In-depth study of current approaches to family therapy. Emphasis on constructivist approaches. Application in the clinical practice of marital and family therapy.

777 Diagnosis and Assessment in Marital and Family Therapy

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Marital and Family Therapy 3 Training in methods of diagnosis and assessment in mental health issues using DSM-IV criteria as applied to the discipline of marital and family therapy.

780 Ethics and Professional Issues in Marital and Family Therapy

Marital and Family Therapy3Study of legal responsibilities, ethical issues, andprofessional matters as they pertain to the practice of marital and family therapy.

781 Family Systems

Advanced study of contemporary family systems with emphasis on research, ethics, media, and current family issues. Prereq: Graduate standing.

782 Advanced Human Development: Birth Through Childhood

In-depth examination of research and theory in lifespan development. Topics include physical, cognitive, social, sexual, and emotional development across the lifespan. Discussion of implications for development and implementation of services for children and families. Prereq: CDFS 784 or departmental approval.

783 Dynamics of Parent-Child Relations

Study of selected theories and research in parentchild relations. Emphasis on interaction between adults and children from infancy to youth. Prereq: CDFS 784, 785, or departmental approval.

784 Advanced Human Development:

Adolescence Through Adulthood3Examination and comparison of both historicaland cutting-edge theories of child development.Exploration of links between theory and research-ing and working with children.

785 Family Theory

Identification and analysis of theoretical approaches to research on the family. Study of frameworks currently used.

CIVIL ENGINEERING (CE)

D. Katti, Chair;Andersen, Director;, K. Katti, Kellogg, Khan, Lin, Padmanabhan, Varma, Yazdani

COURSES

111 Introduction to Civil Engineering

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

204 Surveying

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 threehour laboratories. Prereq: MATH 105. F, S

212 [482] Civil Engineering Graphic Communications

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.

303 Civil Engineering Materials

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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 onehour lectures, 1 three-hour laboratory. Prereq: CE 316 or CM&E 320. F, S

309 Fluid Mechanics

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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

310 Fluid Mechanics Laboratory

Visualization and verification of the concepts of fluid flow, pumps, turbines, and flow meters. 1 two-hour laboratory. Prereq: CE 309. F, S

316 Soil Mechanics

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

343 Structural Engineering and Analysis 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. Includes content from former CE 332. Prereq: ME 223.

370 Introduction to Environmental Engineering

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

371 Environmental Engineering Laboratory 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

404 Reinforced Concrete

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

405/605 Advanced Reinforced Concrete 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 twohour session. Prereq: CE 404. F, S

408 Water Resources and Supply

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

410/610 Water and Wastewater Engineering 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

411/611 Design of Pre-stressed Concrete

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

417/617 Slope Stability and Retaining Walls

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

418 Transportation Engineering

Location, analysis, modeling, and design of multimodal 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.

419/619 Pavement Design

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

421/621 Open Channel Flow

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

430/630 Timber and Form Design

Analysis and design of wood structures and concrete formwork. 2 one-hour lectures, 1 three-hour session. Prereq: ME 223.8

441/641 Finite Element Analysis

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

442/642 Matrix Analysis of Structures

Review of matrix algebra, flexibility and stiffness methods, direct stiffness method, introduction to finite element analysis. 2 lectures. Prereq: CE 343. F, S

444 Structural Steel Design

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.

445/645 Advanced Steel Design

Analysis and design of metal structures including connections, selection of structural systems. 1 one-hour lecture, 1 two-hour session. Prereq: CE 444.S

446/646 Basic Dynamics of Structures

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

451/651 Advanced Surveying

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Property description and legal land surveys. Astronomical observations to establish position and direction. State plane coordinates. 2 one-hour lectures. Prereq: CE 204.

454/654 Geometric Highway Design

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

455/655 Airport Planning and Design

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

456/656 Railroad Planning and Design

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

457/657 Pavement Management Systems

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

461/661 Foundation Engineering

Performance and selection of the following foundations: shallow, mat, combined pile, and drilled piers. 2 one-hour lectures. Prereq: CE 316. F

462/662 Designing with Geosynthetics

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

472/672 Solid Waste Management

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

473/673 Air Pollution

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

477/677 Applied Hydrology

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

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478/678 Water Quality Management 3 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

479/679 Advanced Water and Wastewater Treatment

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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

483 Contracts and Specifications

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

486/686 Nanotechnology and Nanomaterials 3 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.

489 Senior Design

An open-ended capstone design project encompassing a number of the disciplines within civil engineering. 2 one-hour lectures. Prereq: Senior standing. F, S

701 Theory of Elasticity

A theoretical study of linear elasticity, Saint Venant's problems, plain stress, plain strain, strain energy, and torsion. 2 one-hour lectures.

702 Plates and Shells

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.

706 Plastic Design in Structural Steel

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.

709 Dynamics of Structures and Foundations 2 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 onehour lectures. Prereq: CE 446.

714 Theory of Elastic Stability

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.

720 Continuum Mechanics

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

725 Biomaterials-Materials in Biomedical Engineering

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. Prereq: Graduate standing in Engineering or Sciences or instructor approval.

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:

768 [671] Advanced Water and Wastewater Laboratory

CE 461/661.

Studies on selected processes, efficiency and evaluation of water and wastewater treatment. Selected methods of water and wastewater analyses. 2 onehour lectures, 1 three-hour laboratory. Prereq: CE 370, 371, or instructor approval.

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 See Agricultural Economics for description.

772 Rural Logistics and Distribution Management

2 one-hour lectures. Prereq: CE 408. S

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.

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, multi-modal, and paratransit alternatives; policy formulation and analysis. 3 one-hour lectures. Prereq: CE 418.

781 Traffic Engineering

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Traffic characteristics, studies, and control devices; operations analysis and design; aspects of signing, signalization, markings, and lighting; accident analvsis; 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

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)

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

History of the ancient Greeks, their literature, politics, customs, art, and architecture.

360 Grandeur of Rome 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

Study of the poetry of Virgil with a concentration on the Aeneid. Prereq: CLAS 202.

363 Advanced Latin Prose

Readings from Roman historians and other writers of Latin prose. Prereq: CLAS 202.

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364 Advanced Latin Poetry

Readings from Catullus, Horace, Ovid, and other Latin poets. Prereq: CLAS 202.

370 Classical Mythology

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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

Readings from Classical Greek philosophers, historians, and orators in the original. Prereq: CLAS 252.

452 Greek Tragedy

Appreciation of Greek drama through reading selections from Aeschylus, Sophocles, and Euripides in the original. Prereq: CLAS 252.

CLINICAL LABORATORY SCIENCE (CLS)

P. Olson

COURSE

111 Introduction to Clinical Laboratory Science (CCN)

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.

COATINGS AND POLYMERIC MATERIALS (P&C)

Bierwagen, Chair; Croll, Glass, Huo, Webster; Adjunct Faculty: Donley, Hill, Provder

COURSES

472/672 Environment and

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Chemical Industries 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

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

Physical properties of coatings and their components; formulation, design, testing, and applications; color, adhesion, and rheology. Prereq: P&C 474/674.

484/684 Coatings I Laboratory

Polymer synthesis, coating characterization, and properties. Laboratory counterpart to P&C 474. Coreq: P&C 474/674.

485/685 Coatings II Laboratory

Coating formulation; testing, color measurements, synthesis, application methods. Laboratory

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counterpart to P&C 475. 1 six-hour laboratory. Hours flexible. Prereq: P&C 484/684. Coreq: P&C 475/675.

486/686 Corrosion and Its Control by Coatings

Corrosion science: electrochemistry of corrosion, corrosion effects, measurement of corrosion, corrosion control by coatings, characterization of coating protection, accelerated testing. Coreq: CHEM 430, P&C 474/674, 475/675. Cross-listed with CHEM.

771 Modern Methods of Polymer Characterization

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 or departmental approval.

773 Organic Chemistry of Coatings

Organic reactions involved in film formation and degradation. Prereq: CHEM 741 or departmental approval.

775 Color and Appearance

Topics in color and appearance in coatings and weathering of coatings, including photochemical principles. Prereq: P&C 675.

777 Water-Soluble Polymers

Structure of water and its influence on aqueous solution behavior of polymers. Synthetic, carbohydrate, protein, and other bioengineered water-soluble polymers. Prereq: P&C 473/673.

778 Physical Chemistry of Polymers

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: P&C 673.

782 Physical Chemistry of Coatings

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: P&C 474/674.

COMMUNICATION (COMM)

P. Nelson, Chair; Burnett, Collins, Littlefield, Meister, O'Connor, Okigbo, Pearson, D. Sellnow, T. Sellnow, Shumate

COURSES

109 [089] Communicating with

Confidence

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.

110 Fundamentals of Public Speaking (CCN) 3

Theory and practice of public speaking with emphasis on content, organization, language, delivery, and critical evaluation of messages. (ND:COMM)

111 Honors Public Speaking

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 or instructor approval.

112 Understanding Media and Social Change (CCN)

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Exploration of the purpose, function, and impact of media on society. Mass communication majors must earn a grade of B or better.

114 Human Communication

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.

150 Forensic Practice (CCN)

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.

200 Introduction to Media Writing (CCN)

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.

212 Interpersonal Communication (CCN)

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.

214 Persuasive Speaking (CCN) 3 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.

216 Intercultural Communication (CCN) 3 Exploration of the definition, models, and verbal processes of communication between different cultural groups. (ND:SS)

242 Advanced News Photography (CCN) 3 Exploration or photography in all phases of news. Introduction to techniques of photojournalism, including composition, lighting, and computerized editing of news photos. Prereq: COMM 200 or instructor approval.

260 Principles of Internet Web-Based Design 3 This course aims to orient students to Web concepts, design, presentation, and evaluation. Prereq: CSCI 114 or 116.

261 Introduction to Web Development

Introduces the tools used by Web development professionals, including HTML, Web editors, imaging software, Javascript, and Acrobat PDF format. Prereq: CSCI 114 or 116.

271 Listening and Nonverbal

Communication (CCN)

Theory and practice of effective listening; nonverbal aspects of human communication.

308 Business and Professional Speaking

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.

310 Advanced Media Writing

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Construction of professional quality messages for print, public relations, and broadcast. Prereq: B or better in COMM 200.

312 Oral Performance Studies

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.

313 Editorial Processes 3

Principles of print media copy-editing, headline composition, publication design, photo editing, and computer editing. Prereq: COMM 200.

314 Argumentation and Debate (CCN)

Theory and process of argumentation with practical experience in preparation and delivery of formal debate. Prereq: COMM 110.

315 Small Group Communication 3

Focus on group processes, methods of problem solving, parliamentary procedures, and relational components of group interaction.

320 Communication Analysis

Overview and application of basic methods used in communication analysis. Mass Communication and Speech Communication majors must earn a grade of B or better.

325 Applied Research Methods	4
See Political Science for description.	
340, 341 Social Research Methods,	
Laboratory	3,1

See Sociology for description.

345 Principles of Broadcast Production 3 Creation, critique, and analysis of audio production and single camera video productions with special emphasis on radio and television news. Prereq: COMM 112, 310.

362 Principles of Design for Print3Applications of various design principles and pag-
ination techniques to cognitive problem solving
involved in developing material for publication.

370 Principles of Public Relations3Public relations as a professional field; theory,
principles, and practices used in solving public
relations problems. Prereq: COMM 200.

401/601 Survey of Rhetorical Theory3Historical/descriptive examination of rhetoricaltheory from the classical through modern periods.Capstone option.

402/602 Contemporary Rhetoric3Examination of the use of public address in the
contemporary culture to identify styles of usage
and ethical practices employed by communica-
tors. Prereq: Junior standing.

411/611 Communication Theory

Major theoretical approaches to the study of communication from social scientific and

humanistic traditions. Capstone option. Prereq: Junior standing.

412/612 Gender and Communication 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.

425 Specialty Writing 3 Methods and practice of writing features and opinion for print publications. Prereq: COMM 200, 310.

431 Communication Ethics 3 Study of ethical theories and their role in conceptions of mass media responsibility. Capstone course.

433/633 Legal Communication 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.

434/634 Communication Law Exploration of speech and press protections of the First Amendment; includes libel, privacy, electronic media regulation, and speech regulation.

435/635 Popular Culture and Mass Media 3 Analysis of popular culture messages (television, cinema, music, and radio) presented by the media as an expression of social values.

436/636 Issues in Mass Communication 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.

442/642 Information Technologies and Mass Media

Focuses on the impact of globalization on media, business, non-profit and governmental organizations. Prereq: Junior standing.

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443/643 Mass Media and Public Opinion 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.

445 Advanced Broadcast Production 3 Development of skills in the creation, critique, and analysis of television productions in the studio and in the field. Prereq: COMM 345.

450/650 Issues in Communication Theory and philosophy of research issues in the field of communication. May be repeated. Prereq: Junior standing.

451/651 [751] Directing Forensics Theory and practical strategies for coaching individual speaking events and debate at the high school or collegiate levels. Prereq: Junior standing.

462 Web Database Programming

Introduces students to Web database concepts, design, normalization processes, and implementation. Prereq: CSCI 114 or 116, COMM 260, 261.

472/672 Public Relations Campaigns

Social science research as applied to public relations, case study analysis, construction, and implementation of public relations campaigns. Prereq: COMM 370 or departmental approval.

473 Case Study in Public Relations

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.

480/680 Health Communication

Designed to help individuals communicate in the health professions. Exploration of professional behavior as communication, staff-client communication, and team communication in the health-care setting.

483/683 Organizational Communication I 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.

485 Crisis Communication in Public Relations

Crisis communication practices in organizations of all types with emphasis on planning, emergency communication, image restoration, and organizational learning. Prereq: COMM 110. Crosslisted with SAFE.

700 Research Methods in Communication 3 Introduction to research planning and design, methods of research, and presentation of research results.

701 Action Research in Communication 3 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.

702 Introduction to College Teaching in the Humanities and Social Sciences See Humanities for description.

705 Advanced Communication Theory 3 Provides doctoral students with a structured forum for discussion of communication theory and research. Prereq: COMM 611.

706 Advanced Interpersonal Communication 3 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.

708 Advanced Qualitative Methods in **Communication Research**

In-depth application of one of the methods used in qualitative communication research. Prereq: SOC 700 or equivalent.

710 Advanced Quantitative Methods

in Communication Research

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 or equivalent.

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715 Theories of Small Group

Communication

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Survey of theoretical constructs of communication in the small group setting. Examination of current methods of research.

721 Intercultural Communication 3 Advanced theories of verbal and nonverbal behavior, attitudes, and communication styles that affect interaction between cultural groups.

725 Communication and Change 3 Investigation of the diffusion process and related variables affecting an innovation's rate of adoption.

731 [631] Communication Ethics Seminar 3 Study of ethical theories and their relationship to the mass media.

750 Advanced Issues in Communications 3 Advanced theory and philosophy of research issues in the field of communication. May be repeated. Prereq: Graduate standing, instructor approval.

752 Theory of Argument

Philosophy and theory of argumentation; including exploration of analytical methods employed in argumentation.

755 Rhetoric of Environmental Science 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."

767 Rhetorical Criticism

Survey of critical methods of inquiry that may be applied to oral discourse and frameworks for critically evaluating communication processes and products.

782 Theories of Persuasion

Survey of the theories related to persuasion, attitudes, and values of societal groups, and the assessment of attitudes and values held by the public.

784 Organizational Communication II 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.

785 Advanced Crisis Communication in Public Relations

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.

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786 Risk Communication See Food Safety for description.

COMPUTER SCIENCE (CSCI)

Nygard, Chair; Andersen, Denton, Fu, Erickson, Juell, Kamel, Li, Magel, Martin, Perrizo, Salah, Slator, Ubhaya, Xu

COURSES

114 [147] Microcomputer Packages (CCN) 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)

116 [146] Business Use of Computers (CCN)

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)

122 Beginning BASIC/Visual BASIC (CCN)

Introduction to programming in the BASIC/Visual BASIC language. (ND:COMPSC)

125 Beginning COBOL (CCN)

Introduction to programming in the COBOL language. (ND:COMPSC)

126 Beginning FORTRAN (CCN)

Introduction to programming in the FORTRAN language. Prereq: MATH 103.

155 Immigration (CCN)

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 or equivalent.

159 Computer Science Problem Solving 2-3 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.

160 Computer Science I (CCN)

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.

161 Computer Science II (CCN) 4 Advanced concepts in computer science including data structures, algorithm analysis, standard problems such as searching and sorting and memory management issues. Prereq: CSCI 160.

162 Intense FORTRAN (CCN)

Intensive introduction to FORTRAN and its use in engineering applications. Students receive an introduction to numerical analysis, particularly error analysis. Prereq: MATH 103.

172 [194] Intermediate BASIC/Visual BASIC

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.

3 212 Self-Paced C++

Introduction to the C++ programming language. Students complete exercises and programming assignments at their own pace. Prereq: Programming skill in another language.

214 Self-Paced C

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Introduction to the C programming language. Students complete exercises and programming assignments at their own pace. Prereq: CSCI 160.

222 Discrete Mathematics

Sets, functions, relations, logic, methods of proof, mathematical induction, combinatorics, recurrence relations, generating functions. Prereq: CSCI 160.

227, 228 Computing Fundamentals I, II 3 each Two-semester sequence focused on problem solving and writing computer programs in a modern high-level programming language in a state-of-theart programming environment. Second semester includes an introduction to the object-oriented programming paradigm. Prereq: MATH 103 or equivalent, CSCI 227 respectively.

235 Theoretical Computer Science I

Models of computation, regular expressions, finite automata, Kleene's Theorem, lexical analysis, context-free grammars, pushdown automata, introduction to parsing. Prereq: CSCI 161.

236 Theoretical Computer Science II

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.

275 Digital Systems I

See Electrical and Computer Engineering for description.

277 [COMM 461] Introduction to UNIX

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.

315 System Analysis and Design

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.

316 System Testing and Maintenance

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.

345 Topics on Personal Computers

Exploration of some aspects of personal computers not covered in other courses, varies each time it is offered. May be repeated. Prereq: CSCI 161.

366 Files for Database Systems

File organization techniques, design, and implementation of database systems. Prereq: CSCI 374.

371 [COMM 460] Web Scripting Languages 3 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 or equivalent. Cross-listed with MIS.

372 Comparative Languages

Explanation of the concept and impact of a blockstructured language. Several languages will be compared with respect to application, suitability, syntax, and semantics. Prereq: CSCI 161 or 228.

373 Assembly Programming

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.

374 Computer Organization and Architecture

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.

413/613 Principles of Software Engineering 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.

418/618 Simulation Models

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.

426/626 Introduction to Artificial

Intelligence 3 Introduction to artificial intelligence for undergraduates. Includes basic AI concepts and techniques. Prereq: CSCI 372.

453/653 Linear Programming and Network Flows

Linear programming models and applications, primal and dual formulations, computational procedures; introduction to networks, maximum flow, and shortest path problems. Prereq: MATH 265.

454/654 Operations Research

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.

458/658 Microcomputer Graphics

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.

459/659 Foundations of Computer Networks 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

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systems and protocols such as current and future Internet protocols.

460/660 Dynamic Programming 3 Basic principles and algorithms of dynamic programming as applied to sequential decision problems in CS and OR. Prereq: MATH 166.

467/667 Algorithm Analysis 3 Design, correctness, and analysis of algorithms and data structures. Prereq: MATH 166, CSCI 161, 222.

468/668 Database Systems Design Overview of the maintenance and manipulation of databases. Includes a large project in C++. Prereq: CSCI 366.

469/669 Network Security 3 Cryptography and its application to network and operating system security; authentication; e-mail, Web, IP, and wireless security; firewalls and intrusion detection techniques; security threats and countermeasures; legal and ethical issues. Prereq: CSCI 222, 459/659 or equivalent, C/C++ or JAVA.

474 Operating Systems Concepts

How operating systems manage the resources of a computer. Topics include processes, concurrency, scheduling, deadlocks, memory allocation, virtual and secondary storage. Prereq: CSCI 374.

475/675 Operating Systems Design 3 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 or equivalent.

477/677 Object-Oriented Systems 3 Introduction to the concepts and advantages of object-oriented computer systems. Introduces exercises with at least one such language. Prereq: CSCI 372.

479/679 Introduction to Data Mining 3 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) or instructor approval.

488/688 Human-Computer Interaction 3 Survey of the methodologies and alternatives used in developing and evaluating human-computer interfaces. Prereq: CSCI 372.

489/689 Social Implications of Computers 3 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.

702 Performance Evaluation 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.

708 Foundations of Programming

Introduction to formalisms, in which computer programs are considered as mathematical objects, including weakest precondition and predicate calculus. Prereq: CSCI 236.

713 Software Development Processes

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. Prereq: Graduate standing.

714 Software Project Planning and Estimation

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.

715 Software Requirements Definition and Analysis

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.

716 Software Design

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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.

717 Software Construction

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.

718 Software Testing and Debugging

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.

722 Compiler Construction

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 or Graduate standing.

724 Survey of Artificial Intelligence

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 or Graduate standing.

728 Computer Graphics

Principles and algorithms used in computer graphics packages. Emphasis on raster graphics, clipping, hidden-surface elimination, ray-tracing, radiosity. Prereq: Graduate standing.

730 Office Information Systems

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 or Graduate standing.

732 Introduction to Bioinformatics 3 See Mathematics for description.

734 Expert Systems

Examination of types of expert systems, their powers and limitations. Students write their own expert system. Prereq: CSCI 724.

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735 Neural Networks

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.

737 System Simulation

Systems, models, discrete event simulation models, queuing systems, fundamental statistics of simulation. Prereq: CSCI 653, MATH 166.

741 Algorithm Analysis

Algorithm design and analysis, asymptotic analysis, worst and average case, recurrences, generating functions, divide-and-conquer, the greedy method, search and traversal, backtracking, branch-andbound. Prereq: CSCI 161, MATH 166.

742 Algorithms and Complexity

Linear and nonlinear recurrences, algebraic problems, fast Fourier transforms, lower bound theory, computational geometry, the classes P and NPcompleteness, Cook's theorem, NP-hard problems. Prereq: CSCI 741.

745 Formal Methods for Software Development

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.

746 Development of Distributed Systems 3

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.

747 Software Complexity Metrics 3

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 713, 718.

760 Dynamic Programming

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.

761 Integer Programming

Integer linear programs and modeling, theory and algorithms, duality and relaxation, cutting plane and branch-and-bound methods,

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combinational problems, total unimodularity, matching and matroids. Prereq: CSCI 653.

762 Network Flows

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.

765 Introduction to Database Systems

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 or Graduate standing.

766 Database System Internals

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.

773 Foundations of the Digital Enterprise See department for description.

774 Topics of the Digital Enterprise

Topics in database, networks, cryptology, security, and software engineering as they apply to the digital enterprise. Prereq: CSCI 315. Recommended: CSCI 783.

778 Computer Networks

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 or Graduate standing.

779 Advanced Data Mining

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: Basic database course (e.g., CSCI 366, 468, 668, or 765) and CSCI 479/679 or instructor approval.

780 [751 & 752] Methods of Optimization

Elements of convex analysis, constrained and unconstrained multi-dimensional linear and nonlinear optimization theory and algorithms, convergence properties, and computational complexity. Prereq: MATH 166, CSCI 453/653, or instructor approval. Cross-listed with MATH.

783 Topics in Software Systems

Includes an area of computer science not otherwise treated in computer science courses. Varies each time offered. May be repeated. Prereq: Graduate standing or departmental approval.

785 Topics in Computer Architecture

Includes an area of computer architecture not considered in other courses. Varies each time offered. May be repeated. Prereq: Graduate standing or departmental approval.

787 Topics in Operations Research

Includes an area of operational research not considered in other courses. Varies each time offered. May be repeated. Prereq: Graduate standing or departmental approval.

789 Topics in Theoretical Computer Science 3 Includes an area of theoretical computer science not considered in other courses. Varies each time offered. May be repeated. Prereq: Graduate standing or departmental approval.

CONSTRUCTION MANAGEMENT AND ENGINEERING (CM&E)

Yazdani, Chair; G. Smith, Director; McIntyre, Nassar, Nguyen, Zayed

COURSES

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111 Introduction to Construction Management and Engineering 1

Review of the history of engineering and construction, duty, and role of the professional engineer, construction engineer, and construction manager. 1 lecture. F

205 Building Construction

Introduction to planning, design, and construction of residential structures, including cost estimating and project scheduling. Computer applications. 3 lectures. S

212 Construction Graphic Communications 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.

301 Construction Technology and Equipment

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: ME 223, CE 309 or CM&E 325, CE 316 or CM&E 320, IME 440. S

310 Construction Quality Control Management

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

315 Specifications and Contracts

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

320 Soils and Foundations

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

325 Fluid Mechanics for Technologists

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

370 Introduction to Cost Estimating

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

385 Construction Safety

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

403/603 Scheduling and Project Control

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

409 Highway Construction

Attention is given to the design and construction of flexible and rigid pavements including subgrade, base courses, surface courses; evaluation criteria including soil, climate, traffic, material, drainage, initial and maintenance cost considerations; construction practices. 2 lectures. Prereq: CE 316.8

411/611 Construction Cost Estimating

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

412/612 Construction Management

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. 3 lectures. Prereq: CM&E 403. F

413 Construction Capstone

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Capstone project dealing with a construction project. 2 lectures. Prereq: Senior standing in Construction Management. F, S

420 Labor Productivity in Construction 3 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

421 Electrical and Mechanical Construction 3 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

425/625 Decision Making and Risk Analysis 3 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

430/630 Land Development 3 Practical applications of the planning, design, and construction phases of the land development process. Computer applications. 3 lectures. Prereq: CE 204, Senior standing. F

450 Steel Design for Technologists Selection of metal structural systems with simplified design and structural characteristics of members and connections. Methods of assembly. 3 lectures. Prereq: ME 223. F

453 Concrete Design and Construction 3 Fundamentals of design for concrete mix. Formwork and concrete structures. 3 lectures. Prereq: ME 223. S

455 Formwork Design

Design and construction of formwork structures for concrete structures. Computer applications. 2 lectures. Prereq: ME 223.

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489 Construction Design Capstone project focusing on design and construction activities. Prereq: Senior standing in

782 Public Infrastructure Management and Construction 3

See Civil Engineering for description.

Construction Engineering, F, S

COUNSELOR EDUCATION (CNED)

Hannon, Hundley, Nielsen, Rush, Sommer, Wigtil

COURSES

710 [760] Counseling Techniques 3 Basic principles and techniques in the counseling process. Emphasis given to counseling techniques from several counseling orientations. Prereq: Admission to program.

711 [761] Counseling Theory 3 Study of various theories and philosophies of counseling and therapy. Prereq: Admission to program.

712 [766] Dynamics of Self 3 Application of personality theory and the life stages to human behavior and the counseling process. Prereq: Admission to program or instructor approval.

713 [754] Assessment Techniques Techniques and procedures of studying the individual and diagnostic process in identifying client issues. Prereq: CNED 710 and 711, or instructor approval.

714 [755] Career Counseling & Testing 3 Study of theories of career development and the use of career information and testing in career counseling. Prereq: Admission to program or instructor approval.

715 [757] Professional Orientation & Ethics Introduction to dealing with professional and ethical responsibilities and multicultural issues in the counseling field. Prereq: CNED 710, 711.

716 [758] Social & Cultural Foundations of Counseling

Issues and trends in counseling with multicultural and diverse populations within our society. Prereq: CNED 710, 711.

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720 [762] Group Counseling

Study of group counseling principles appropriate to various counseling settings including schools, treatment centers, and agencies. Includes a group experience. Prereq: CNED 710, 711.

723 [764] Assessment and Diagnosis in Counseling

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. Prereq: Admission to program or instructor approval.

725 [751] Elementary School Counseling

Exploration of models of elementary counseling and examination of counseling materials in implementing a counseling program. Prereq: Admission to program or instructor approval.

726 [753] Middle School Counseling

Exploration of models for middle school counseling and examination of counseling materials for middle school counseling programs. Prereq: Admission to program or instructor approval.

727 [750] Secondary School Counseling

Overview of principles and functions of a secondary school counseling program and examination of secondary school counseling materials. Prereq: Admission to program or instructor approval.

728 [752] Guidance Administration & Consulting

Role of administrators, counseling personnel, and teachers in the management of and consulting in K-12 counseling programs. Prereq: Admission to program or instructor approval.

730 [759] Sexual Functioning & Abuse Issues in Counseling

Study of sexual dysfunction, incest, and abuse, and strategies of intervention and counseling with victims and perpetrators. Prereq: CNED 710, 711.

731 [768] Counseling Children & Adolescents

Counseling with children and adolescents including specific counseling strategies; mental, physical, and emotional development issues related to counseling. Prereq: CNED 710, 711.

732 [773] Family Counseling

Principles and techniques of family counseling, study of family dynamics, family systems, and theories of family counseling. Prereq: CNED 710, 711.

733 [774] Marital Counseling

Survey of marital counseling theories and techniques; analyses of dysfunctional communications. Prereq: CNED 710, 711.

734 [756] Dynamics of Addiction

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

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.

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770 Counselor Supervision

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

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**

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. Positivistic and non-positivistic 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

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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,

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writing, and submitting manuscripts for publication.

CRIMINAL JUSTICE (CJ)

Thompson, Chair: J. Bouffard, L. Bouffard, 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.

230 [SOC 408] 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

See Political Science for description.

330 Criminal Law and Procedure

Examination of criminal law and procedure including search and seizure laws, rights of defendants and victims, and due process in criminal law.

406/606 [SOC] Crime and Delinquency

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

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 [SOC] Criminalization

Analysis of historical and contemporary developments in the functions of police and courts. Focuses on societal, inter- and intra-organization contexts.

461/661 [SOC] Corrections

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

Synthesis of criminal justice research, methods, and criminological theory. Prereq: Senior standing.

(The following courses require Graduate standing in Criminal Justice or instructor approval.)

702 [SOC] 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

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 [SOC] Juvenile Corrections

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 [SOC] Criminal Justice Policy

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 [SOC] Individual Theories of Crime

Review of historical and contemporary individual theories of crime. Discussion of the assumptions, causes, and policy implications of criminological theories. Prereq: CJ 703.

722 [SOC] Structural Theories of Crime

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 [SOC] Violence

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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 [SOC] Criminogenic Commodities

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 [SOC] Criminal Investigations

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 [SOC] Administrative Policing

Organizational theory, leadership, communication, labor relations, and crisis management in police administration.

757 [SOC] Community Policing

Examination of the history, philosophy, theory, and implementation of community policing. Comparison of community policing styles with other policing styles.

759 [SOC] Security Management

Examination of public and private security concerns and methods for addressing them. Analysis of protection of money, materials, information, and secrets.

762 [SOC] Community Corrections

Evaluation of practices, issues, and trends in community corrections. Focus on probation, parole, halfway houses, and other community alternatives to incarceration.

763 Correctional Rehabilitation

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.

765 Crime Prevention

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.

768 [SOC] Gender and Justice

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.

ECONOMICS (ECON)

Lambert, Chair; Gustafson, Hearne, Herren, Koo, B. Leitch, Mack, O'Relley

COURSES

105 Elements of Economics (CCN)

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)

201 [AGEC 110] Principles of

Microeconomics (CCN)

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:

202 [AGEC 111] Principles of

Macroeconomics (CCN)

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)

324 Money and Banking

Institutional and theoretical framework of the financial structure including the banking system, Federal Reserve, money markets, and international monetary systems. Prereq: ECON 201, 202.

341 Intermediate Microeconomics 3

Analysis of markets in terms of efficiency, resource use, and economic welfare. Prereq: ECON 201, 202, MATH 146.

343 Intermediate Macroeconomics 3 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.

456/656 History of Economic Thought 3 Development of economic thought from the mercantilists to Keynesian economics. Prereq: ECON 341 or BUSN 451 and ECON 324 or 343.

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461/661 Economic Development

Analysis of the main causes of economic development. Prereq: ECON 341 or BUSN 451.

465/665 Labor Economics

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.

470/670 Public Finance

Taxation, intergovernmental fiscal relations, and public expenditures; implications of various taxation policies. Prereq: ECON 341 or BUSN 451.

472/672 International Trade

Theories of international trade, payments, and foreign exchange markets. Prereq: ECON 341 or BUSN 451.

476/676 Monetary Theory and Policy

3 Analysis of relationships among money, credit, employment, price stability, and national monetary policy. Prereq: ECON 324 or 343.

480/680 Industrial Organization

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.

481/681 [AGEC 480/680] Natural Resource Economics

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.

482 [AGEC 381] Environmental Economics 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. Cross-listed with NRM.

EDUCATION (EDUC)

Martin, Interim Chair; Daniels, Duffield, Haney, Miller-Boschert, Overton, Schmidt, Stammen, Wageman, Wilhelm

COURSES

120 Peer Counseling

Designed to bring peer counseling theory and practice together in helping freshmen overcome the hurdles of the first year. May be repeated.

121 Improvement of Reading 1 A developmental reading program designed to help the student improve in reading efficiency.

122 Interpersonal Relationships

Study of the development of interpersonal relationships with a focus on listening and sharing in an experiential manner.

123 Study Skills

Assistance in the development of study skills necessary for academic achievement through learning and practice.

124 Career Planning

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Study of the world of work with attention to self-assessment, vocational choice, and career planning.

125 Assertiveness Training

Behavioral approach to assertiveness combining a cognitive approach with role-play and discussion.

300 Orientation to Elementary Teaching

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.

321 Introduction to Teaching

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.

322 Educational Psychology

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.

381 Early Experience

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. Crosslisted with H&CE.

451/651P Instructional Planning,

Methods, and Assessment

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.

471/671 Middle School Philosophy and Curriculum

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.

472/672 Middle Level Teaching Methods

Instruction and guidance in the design, implementation, and assessment of teaching strategies adapted to young adolescents. Prereq: EDUC 451 or Graduate standing.

475 Reading in the Content Area

Introduction to the relevance and need for incorporating reading and developing reading skills in middle and high school classrooms.

480 Stress Management

The dynamics of stress, sources and symptoms of stress, and stress management techniques will be presented and practiced.

481/681P, 482/682P, 483/683P **Classroom Practice/Methods of**

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Teaching I, II, III 2-3 each Specialized methods and classroom practices appropriate to the specific subject area. Prereq: EDUC 321, 322, 381, admission to School of Education. For 482/682P: EDUC 481. For 483/683P: EDUC 481, 482.

485/685P Student Teaching Seminar 1

Orientation to student teaching. Analysis of professional issues and concerns associated with education. Prereq: EDUC 321, 322, 381, 389/489/689P, 451/651P, 481/681P, 482/682P, 483/683P, 486/686P, admission to School of Education. Coreq: EDUC 487/687P.

486/686P Classroom Management for Diverse Learners

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.

487/687P Student Teaching 6-12

Supervised teaching in an approved and accredited school. Includes an on-campus seminar. Prereq: EDUC 321, 322, 381, 389/489/689P, 451/651P, 481/681P,482/682P,483/683P,486/686P,admission to School of Education. Coreq: EDUC 485/685P.

489/689 [389] Native Americans and **Multicultural Instructional Practices**

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.

702 Statistics in Educational Research

Basic theory; techniques for using descriptive and inferential statistics; application in educational research designs.

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703 Research, Measurement, and **Program Evaluation**

Methodology and design of research studies; organization, reporting analysis, and interpretation of research.

705 Teaching College Science	3
See Biological Sciences (Biology) for descri	ption.

/10 Philosophy of Education	4
Major philosophical concepts and principles	of
education from Plato to the present.	

712 Social, Cultural, and Political

Dimensions of Schools Social processes and interaction among diverse populations in educational settings. Relationship of schools to society.

714 History of American Education 2

Historical and intellectual development of education in the United States from the colonial period to the present.

715 The Superintendency

This course deals with examining the role and functions of the public school district administrator.

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716 Comparative Education

Analysis of educational systems of selected nations, including emerging and economically developed countries.

717 Adult Learning

Includes recent research concerning adult learning in the context of planning and operating effective adult education programs.

718 Community Education

Study of the theory base on which community education is founded. Consideration is given to implementing the concept in the community with available resources.

719 Planning and Conducting Needs Assessment

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, completion of master's program courses, or committee approval.

720 Supervision of Student Teachers

Planning and carrying out effective supervision techniques when supervising student teachers in respective subjects.

721 Assessment Techniques

for Educational Institutions

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, completion of master's program courses, or committee approval.

722 Instructional Systems, Media, Materials

Preparation of instructional systems in support of a variety of teaching techniques and alternative media approaches.

723 Diversity and Educational Policy

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, completion of master's program courses, or committee approval.

724 Advanced Educational Psychology

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.

725 Institutional Analysis Techniques

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, completion of master's program courses, or committee approval.

727 Higher Education Law

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, completion of master's program courses, or committee approval.

728 Instructional Technology or Teaching and Learning

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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, completion of master's program courses, or committee approval.

729 Organization and Administration of Telecommunication Technologies

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, completion of master's program courses, or committee approval.

730 Leadership, Planning, and Organizational Behavior

Introduction to models of educational leadership including organizational structure, theory, and leadership styles. Consideration of concepts, problems, and issues in administration.

731 Educational Law and

Organizational Structure of Schools 3 Examination of the legislative and judicial actions affecting the public schools. Consideration is given to contemporary legal issues for teachers, administrators, and boards.

732 Curriculum, Instruction, and Learning Theory

Investigation of curricular decision-making and program evaluation strategies as they affect the educational program. Problem-solving skills are presented through theory and simulation. Prereq: EDUC 730.

733 Technology and Information Systems 2 Provides an understanding of selected computer applications for educational administrators at the building and district office levels.

734 Personal Communications and Ethics

Prepares aspiring school leaders to plan for their personal and professional development and to understand and use the principles of communication, ethics, and values.

735 Personnel, Supervision, and Staff Development

Specific techniques and systems to supervise instruction. Review of interpersonal communication and group process skills as applied to administrative supervision. Prereq: EDUC 730.

736 Policy and Educational Finance

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.

737 The Helping Relationship and the Elderly 3 The theoretical foundations and the techniques of the helping relationship between the helper and people of advanced age will be studied and applied.

738 Administration of Elementary Schools 2 Common elements of leadership as they apply to the principalship. Consideration of practical applications in an elementary school setting. Prereq: EDUC 730.

739 Administration of Secondary Schools 2 Common elements of leadership as they apply to the principalship. Consideration of practical applications in a secondary school setting. Prereq: EDUC 730.

740 Financing Higher Education

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This course provides funding theories and procedures necessary to develop and maintain financing for higher education institutions. Prereq: Admission to doctoral program, completion of master's program courses, or committee approval.

741 Higher Education Student Affairs and Enrollment Management

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, completion of master's program courses, or committee approval.

742 Elementary School Curriculum 2

History, development, evaluation, and revision of the curriculum. Review of recent research in elementary school curriculum.

743 Secondary School Curriculum

Study of contemporary curriculum patterns with emphasis on curricular construction and evaluation.

744 Administration of the Middle School 2 Organization and administration of educational programs for early adolescents with special consideration given to block scheduling, interdisciplinary teams, and advisor-advisee problems. Prereq: EDUC 730.

745 Program Evaluation Research

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, completion of master's program courses, or committee approval.

746 Institutional Quality Control

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, completion of master's program courses, or committee approval.

748 Collective Bargaining and Negotiation in Education

Study of the principles and processes of collective bargaining in public educational institutions. Development of negotiation skills through participation in simulations.

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749 Case-Based Educational Research and Statistics

The purpose of this course is to have graduate students understand statistical meanings and concepts that will provide the professional expertise needed to serve schools and institutions with their contemporary research and accountability needs. Prereq: Admission to doctoral program, completion of master's program courses, or committee approval.

750 Reflective Practice and Research in Education

An examination of teaching and professional practice based on reflective practice. Analyze educational research as related to and informs practice. Prereq:Admission to graduate program.

751 Students and Their Learning 3 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. Prereq:Admission to graduate program.

752 Curriculum Design and Delivery 3 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. Prereq: Admission to graduate program.

753 Managing and Monitoring Learning 3 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 in student learning will be explored. Prereq:Admission to graduate program.

763 Education and Training for Business and Industry

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, completion of master's program courses, or committee approval.

767 Organization and Administration of Higher Education

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, completion of master's program courses, or committee approval.

769 Politics and Policy Analysis in Education 2 The purpose of this course is to examine political and policy development in American public education in order to understand current local, state, and national issues. Prereq:Admission to specialist program or committee approval.

770 Empowerment and Advocacy

in Human Development and Education 3 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.

771 Structural and Equation Modeling Fundamentals

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This course is designed for faculty and doctorallevel students who need a significant familiarity with those statistical techniques known collectively as "structural equation modeling." Prereq: Admission to doctoral program, completion of master's program courses, or committee approval.

772 Curriculum and Instructional Development

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, completion of master's program courses, or committee approval.

775 Content Area Reading

Examination of content, instructional methodologies, and evaluation techniques for reading in content classes.

776 Qualitative Research and Program Evaluation

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, completion of master's program courses, or committee approval.

777 Tort Liability

Examination of the legal liability of teachers, administrators, and public school boards for injurious intentional or unintentional acts. Prereq: EDUC 731.

778 School Fund Management

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. or equivalent in Educational Administration.

779 Quantitative and Survey Research

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, completion of master's program courses, or committee approval.

780 Instructional Models

Investigation of current practices and trends in instructional models. Emphasis is on the relationship of current research to contemporary practice.

781 Science Teaching and Curriculum

Overview of recent research on science teaching, learning, and curriculum. Special attention given to contemporary theories on science teaching models that enhance student understanding.

782 Supervisory and Administrative Theories 4 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.

783 Computer Data Management and Decision Making

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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.

784 School Personnel Administration

Study of personnel administration in public school systems. Includes an examination of the purposes, policies, plans, procedures, and personnel administration. Prereq: EDUC 782.

785 Organization and Administration of Vocational/Technical Education

of Vocational/Technical Education 2 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.

786 School Facility Planning

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. or equivalent.

787 Issues in Education

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.

788 School Finance and Business Management

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.

789 School Community Relations 2

Purposes, organization, agencies, and criteria of good school-community relationships; knowledge and techniques for effective public relations. Prereq:EDUC739,M.S.or equivalent in Educational Administration.

ELECTRICAL AND COMPUTER ENGINEERING (ECE)

Ewert, Chair; Farden, Glower, Green, Jorgenson, R. Katti, Kavasseri, Lima, Nelson, Patterson, B. Rao, Rogers, Schroeder, Tareski, Yuvarajan

COURSES

111 Introduction to Electrical and

Computer Engineering3Introduction to electrical and computer engineering problem solving, design, and professional issues. 3 lectures. Prereq: MATH 105. F

173 Introduction to Computing 3

Programming in a high level language with applications to engineering computation, analysis, and design. 3 lectures, 1 recitation. Prereq: MATH 105. F, S

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EE 206 Circuit Analysis I (CCN)

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

275 Digital Systems I

Introduction to number systems, combinational circuits, and sequential circuits. 3 lectures. Prereq: MATH 103. Cross-listed with CSCI. F, S (ND:SCI)

301 Electrical Engineering I

Introduction to electrical engineering for nonmajors. 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

303 Electrical Engineering II

Electronic circuits and their applications. Electromechanical energy conversion. Transformers, DC and AC machines. 3 lectures. Prereq: ECE 301. F, S

306 Electrical Engineering Lab I

Electronic instruments and measurements. Applications to electrical and electronic circuits, power devices, and systems. 1 two-hour laboratory. Coreq: ECE 303. F, S

311 Circuit Analysis II

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. Includes content from ECE 312. Coreq: MATH 266. F, S

312 Digital/Analog Circuits Lab

Experiments in digital and analog circuits. 1 two-hour laboratory. Prereq: ECE 275. Coreq: ECE 311. F S

314 Electromagnetics/Signals Lab

Experiments in signals/systems and electromagnetics. 1 two-hour laboratory. Prereq: ECE 312, 343, 351. F, S

321 Electronics I

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. Includes content from ECE 322. Coreq: ECE 311. F S

322 Electronics I Laboratory

Laboratory experiments on electronic devices and basic electronic circuits. 1 two-hour laboratory. Prereq: ECE 321. F, S

323 Electronics II

Frequency response of amplifiers. Feedback amplifiers. Power amplifiers. Introduction to digital electronics. 3 lectures. Prereq: ECE 321. F, S

324 Electronics II Laboratory

Experiments on electronic circuits and signals and systems. 1 two-hour laboratory. Prereq: ECE 322, 323, 343. F, S

331 Energy Conversion

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Magnetic circuits, transformers, DC and AC rotating machines. 3 one-hour lectures, 1 two-hour laboratory. Prereq: ECE 311. S

341 [441] Random Processes

Principles of probability.Application of probability and statistics to electrical and computer engineering problems. 3 lectures. Prereq: MATH 266. F, S

343 Signals and Systems

Discrete-time and continuous-time signals and systems. Linearity, frequency response, difference and differential equations, transfer techniques. 4 lectures. Includes partial content from ECE 314. Prereq: ECE 311. F, S

351 Applied Electromagnetics

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 twohour laboratory. Includes partial content from ECE 314. Coreq: ECE 311. F, S

373 Assembly Programming See Computer Science for description.

374 Computer Organization

See Computer Science for description.

375 Digital System Design and

Implementation3Experience with digital system design and pro-
totyping, including use of digital laboratory
equipment. 2 lectures, 1 two-hour laboratory.
Prereq: ECE 173, 275. F

376 Embedded Systems

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. F, S

401 Design I

Capstone experience in formulation and design of a system or device. Basic project planning and software tools. 1 lecture. Prereq: ECE 321. S

402 Machines/Control Systems Lab

Experiments in machines and control systems. 1 two-hour laboratory. Prereq: ECE 331, 461. F, S

403 Design II

Capstone experience in formulation and design of a system or device. 2 two-hour design laboratories. Includes partial content from ECE 401. Prereq: ECE 401, Senior standing. F

404 Communications/DSP Lab

Experiments in communication systems and digital signal processing. Prereq: ECE 443. F, S

405 Design III

Capstone experience in formulation and design of a system or device. 3 two-hours design laboratories. Includes partial content from ECE 401. Prereq: ECE 403. S

411/611 Optics for Scientists and Engineers 3 See Physics for description.

411L/611L Optics for Scientists and Engineers Laboratory See Physics for description.

417/617 [457/657] Optical Signal Transmission

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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 or equivalent. S/2

421/621 Communication Circuits

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 321.8

423/623 Digital Electronics

Analysis and design of digital integrated circuits. Characteristics and applications of logic gates and regenerative logic circuits. 3 lectures. Prereq: ECE 321. S

3 425/625 Introduction to Semiconductor Devices

Semiconductor Devices 3 Properties and applications of semiconductors and solid-state electronic devices. Semiconductors, junctions, and transistors. 3 lectures. Prereq: ECE 321, 351. F/2

431/631 Power Systems

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

4 433/633 Power Systems Design

Unbalanced power systems, economic dispatch, transients in power systems, power system stability, power system protection. 3 lectures. Prereq: ECE 311.S

437/637 Power Electronics

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

443/643 Communications I

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

444/644 Applied Digital Signal Processing3Digital 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, 343. F

445/645 Communications II

Continuation of ECE 443. Digital communications systems. Optimum receivers. Information theory and coding. 3 lectures. Prereq: ECE 443. S/2

453/653 Signal Integrity 3

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

455/655 Designing for Electromagnetic

Compatibility 3 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

461 Control Systems Analysis and design of control systems. Controller design to meet time and frequency specifications. 3 lectures, 1 two-hour laboratory. Prereq: ECE 343. F

463/663 Digital Control Analysis and design of sampled-data control sys-

tems including z-transforms, sampling theory, design to specifications, controllability, observability, stability, and optimization. 3 lectures. Prereq: ECE 461.

470 Digital Systems II

Design and analysis of reliable digital systems through robust information coding, fault avoidance, and fault-tolerance. 3 lectures. Prereq: ECE 275.F

471 Computer Systems Design and Implementation

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

483/683 Instrumentation for Engineers 3 Study of instrumentation including design, fabrication, and application. Prereq: Senior standing. F

485/685 Biomedical Engineering 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

487/687 Cardiovascular Engineering 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

701 Advanced Engineering Problem Solving 3 Application of advanced mathematical and computational methods to engineering problems. 3 lectures. S

702 Advanced Research Topics Prepare the student in finding a major advisor; defining the research questions or objectives; beginning a literature search; learning how to prepare a manuscript and/or grant application with their major advisor. F

703 Advanced Teaching and Classroom Topics

To help prepare the Ph.D. student for the challenge of teaching in a classroom. F

721 Integrated Circuits

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.

723 Advanced Electronics

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)

731 Power System Protection

Power system protective relaying. Generator, transformer, line, bus, motor protection. 3 lectures. Coreq: ECE 433/633. S

733 Power Distribution

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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

741 Signal Processing I

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.

743 Signal Processing II

Discrete-time Wiener and Kalman filtering. Least squares signal processing and filter design. Spectral analysis. Adaptive signal processing. 3 lectures. Prereq: ECE 741. S

745 Statistical Communications

Advanced topics in communications theory including detection theory, estimation theory, and information theory. 3 lectures. Prereq: ECE 443/643.8

751 Electromagnetic Theory and Applications

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

755 Advanced Topics in Electromagnetics 3 Topics of current interest in electromagnetics, microwaves, and optics. 3 lectures. Prereq: ECE 751 or departmental approval. S/2

761, 763 Advanced Control

Theory I, II 3 each State variable formulation of the control problem; system identification. Introduction to adaptive, distributed, multivariable, nonlinear, optimal, and stochastic control. Prereq: ECE 461, 761 respectively.

774 Computer Architecture

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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.

778 Computer Networks

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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)

EMERGENCY MANAGEMENT (EMGT)

Slobin, Chair; Klenow, Oyola-Yemaiel, Wilson, Youngs

COURSES

130 Principles of Emergency Management 2 Examines fundamental principles of emergency management and how public and private agencies work together to enhance disaster-related resources and capabilities.

135 Emergency Planning

Develops capacity for effective participation in the all-hazard emergency operations planning process to save lives and protect property threatened by disasters or emergencies.

167 State Hazard Mitigation Planning

Provides knowledge and skills needed to implement multi-hazard mitigation in community's long-range planning goals.

185 Disaster Response and Recovery Operations

Introduces concepts and operations of a disaster environment, especially major disaster incidents, and examines state and local roles and responsibilities of response and recovery efforts.

201 Introduction to Emergency Management 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.

411/611 Community Disaster Preparation

Nature and rationale for public awareness of potential hazards that communities face, preparedness for these hazards, and potential strategies to mitigate adverse consequences.

413/613 Building Disaster Resilient Communities

Role of emergency management programs in community resilience and sustainability; incorporation of preparedness, mitigation, response, and recovery in community comprehensive and strategic planning.

415/615 Rural Society and

Emergency Management

Application of emergency management principles and procedures of disaster preparedness, mitigation, and response and recovery in the rural context.

421/621 Hazard Mitigation Theory and Practice

Examination of disaster mitigation theory and the rationale and context of mitigation procedures, programs, and planning.

431/631 Disaster Response **Operations and Leadership**

3 Principles and procedures related to emergency operations plans, warning, evacuation, search and

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rescue, mass casualty care, sheltering, donations management, disaster declaration, and incident debriefing.

441/681 Disaster Analysis

Examination of natural and human-made disasters from a multidisciplinary perspective.

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451/651 Floods, Blizzards, and Tornadoes

3 Role of emergency management in floods, blizzards, and tornadoes; response of local, state, and federal governments and agencies to these conditions.

453/653 Emergency Management

Law and Ethics

Legal principles and ethical issues that impact emergency management services.

461/661 Private Sector Crisis Management 3 Emergency management, risk assessment, component vulnerability, disaster recovery, and organizational continuity in the private sector.

463/663 Voluntary Agency Disaster Services 3 Examination of the roles played by local, state,

national, and international voluntary agencies in emergency preparedness, mitigation, response, and recovery.

483/683 Holistic Disaster Recovery

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 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

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

Hazardous materials contingency planning and environmental regulations at the community, state, and federal levels.

732 Disaster Response Theory and Practice 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)

Helweg, Dean

COURSES

111 Introduction to Engineering

Designed to provide general engineering students with an opportunity to review, study, discuss, and evaluate various engineering professions as career choices. F, S

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310 Entrepreneurship for Engineers and Scientists

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

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

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

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

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

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

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

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

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

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

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, Cater (Emeritus), Cavins, Cosgrove, Fricker, Johnston, Krishnan, Martinson, Nichols, O'Connor, Peterson, Rupiper Taggart, Salting, Sandland, Scott, Shaw, Strandness, Trump

COURSES

103 English for Non-Native Speakers:

Grammar/Writing

R-5

R-5

R-5

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Grammar, usage, syntax, and extensive work with sentence and paragraph structure, stressing unity, coherence, and emphasis for ESL students. Does not satisfy any requirements for graduation.

104 English for Non-Native Speakers: Vocabulary/Reading

R-5 Intensive instruction in vocabulary and reading skills required for successful completion of university work by speakers of English as a second language (ESL). Does not satisfy any requirements

for graduation.

106 English for Non-Native Speakers: Oral Skills

Intensive instruction in speaking and listening skills required for successful completion of university work by ESL students. Does not satisfy any requirements for graduation.

107 English for Non-Native Speakers: Advanced Skills

Development of advanced level English skills in speaking, listening, reading, and writing for nonnative speakers. Emphasis on skills needed for academic work. May be repeated. Does not satisfy any graduation requirements.

110 College Composition I (CCN)

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)

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.

209 Introduction to Linguistics 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.

215 Writing for Work (CCN) 3 Introduction to business and technical writing and to strategies for completing business-related writing projects. Prereq: ENGL 110, 120.

220 Introduction to Literature (CCN) 3 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)

222 Introduction to Poetry (CCN) 3 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.

225 Introduction to Film (CCN) 3 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)

226 The Poetry of Rock (CCN) 3 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. 240 World Literature Masterpieces (CCN)3Study of representative cultural and literary materials from the ancient world to modern times.

251 British Literature I (CCN) 3 Survey of major works and writers in British literature from the Anglo-Saxon period through the 18th century. (ND:HUM)

252 British Literature II (CCN) 3 Survey of major works and writers in British literature from the Romantic Age to the present. (ND:

261 American Literature I (CCN) 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)

262 American Literature II (CCN) 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)

271 Literary Analysis (CCN) 3 Introduction to traditional and contemporary approaches in the study of literature and the fundamental skills required for the analysis of literary texts.

275 Introduction to Writing Studies

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.

320 Practical Writing

HUMD

Intensive practice of the writing needed in professional settings: writing to inform, analyze, evaluate, and persuade. Prereq: ENGL 120, Junior standing.

321 Technical Writing for Engineers

Study and practice of technical communication forms produced by engineers in their everyday professional lives. Emphasizes making effective choices for written and oral communications intended for other engineers as well as for more general audiences. Prereq: ENGL 120, Junior standing.

322, 323 Creative Writing I, II 3 each Writing poetry, short stories, and nonfiction, with the goal of publishing a manuscript. Exploration of contemporary genres and writing techniques. Prereq: ENGL 120.

330 British and American Women Writers 3 Investigation of the literary portrayal of women and its effects on society. Some consideration of problems specific to women writers.

331 Contemporary Women Writers3Study of the language, imagery, themes, and genresin 20th century literature by women of variouscultural, ethnic, and national backgrounds.

333 Fantasy and Science Fiction 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.

335 Multicultural Writers

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.

340 19th Century American Novel

Selected novels reflecting problems and ideas, including minority viewpoints, of the Westward Movement during the 1800's. Emphasis is on change from romantic to realistic/naturalistic genres.

341 20th Century American Novel3Selected novels reflecting social, psychological,and literary trends after World War I. Includes mul-ticultural and women authors, as well as recentexperiments in the genre.

342 19th Century American Short Story3Development of the American short story istraced from its hidden beginnings in Ben Franklinthrough the 19th century romantics, regionalists,realists, and naturalists.

343 20th Century American Short Story3Development of the American short story is tracedby focusing on psychological realists, social critics,regionalists, Freudians, and the story of manners.

344 American Drama

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20th century traditions and experiments on the American stage. Includes classic writers like O'Neill, Williams, Miller, and Albee, as well as recent authors and techniques.

345 Themes in American Culture3

A multidisciplinary approach, including art, music, and literature, to various eras and themes in American cultural history.

357 Visual Culture and Language

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.

358 Intermediate Composition

Theory and practice for writing multiple genres in the humanities and social sciences. Prereq: ENGL 120, Junior standing.

380 Shakespeare

Study of representative poetry, comedies, histories, and tragedies.

450/650 Contemporary Linguistics3Language characteristics (sound, structure, meaning, conversation), relation to culture, first and second language acquisition.

451/651 Advanced English Grammar3Systematic examination of the structures and processes that shape English sentences; developmentof skills to analyze why certain structures are moreor less appropriate. Prereq: ENGL 450.

452/652 History of the English Language3Development of the English language from itsGermanic origins to the modern period.

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453/653 Social and Regional Varieties of English

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.

454/654 Language Bias

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.

457 Electronic Communication

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.

458/658 Advanced Writing Workshop

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, Junior standing.

459/659 Researching and Writing Grants and Proposals

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.

462/662 Modern European Drama 3 Study of representative modern plays and authors, including English and Irish, as well as those of continental Europe.

464/664 Comparative Literature3Study of important works of world literature in aparticular genre: epic, romance, drama, or novel.

467 English Studies Capstone Experience 3 Cumulative and integrative study for English majors of English language, literature, and composition. Prereq: ENGL 271.

470/670 American Literary Renaissance 3 Intensive study of major romantic and post-romantic figures, such as Hawthorne, Melville, Emerson, Thoreau, Stowe, Jewett, Whitman, and Dickinson. Combination varies.

471/671 American Realistic Literature 3 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.

472/672 20th Century American Writers 3 Intensive study of major American writers from 1900 to 1950.

473/673 Contemporary American Literature 3 American experimental and innovative literature from 1950 to the present, including existential, Black, women's, and social criticism works.

474/674 Native American Literature

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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.

475/675 Regional Literature

Study of the literature and ideas of different regions of 20th century America—South, West, and Midwest. Emphasis is on regional authors and unique genres.

477/677 Modern Poetry 3 Major poets in English during the 20th century up to World War II. Alternates between British and American poets, including Yeats, Auden, Smith, Eliot, Pound, Bishop.

480/680 Medieval Literature3British poetry and prose from the beginning of the

Middle Ages to 1500, excluding Chaucer.

481/681 Chaucer

Intensive study of The Canterbury Tales plus selected readings from Chaucer's other works.

482/682 Renaissance Literature3Study of British writers of the 16th and 17thcenturies.

484/684 Restoration and 18th Century

Drama 3 Comedy, tragedy, and farce from Dryden to Sheridan.

485/685 18th Century Literature 3 Study of major writers: Dryden, Pope, Swift, and Johnson, with occasional excursions into the fictional territory of Richardson, Fielding, Sterne, and Smollett.

486/686 Romantic Literature3Study of major British writers from the FrenchRevolution to the coronation of Queen Victoria.

487/687 Victorian Literature3Study of the nonfiction and poetry of 19th century England. Focus on revolutionary ideas as theyevolved and changed Victorian society.

488/688 20th Century British Writers

Study of selected British writers from the Edwardian period to the present.

489/689 British Novel3Study of selected major British novels from the18th century to the present.

750 Linguistic Theory 3 Issues and theoretical trends in the core, system-internal dimensions of language: phonology/morphology, syntax, pragmatics, and discourse analysis.

751 Directions in English Studies

An identification and study of important trends in higher education and English studies in the context of the history, politics, and economics of post-secondary education.

752 Pedagogy of English Studies

Introduction to pedagogical theory and research, tying the two to application, and addresses not only the teaching of writing but of linguistics, literature, rhetoric, and theory in these areas.

753 Technology in English Studies

Examination of how technology influences the theory, research and pedagogy of English Studies, which in turn combine to function as a part of professional academic practice. Prereq: Graduate standing.

755 Composition Theory

Study of contemporary theories of teaching writing with frequent summary/response papers on assigned readings and a research paper on composition theory.

756 Composition Research

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Study of designs and basic statistics for writing research; analysis of current research; and a research project in composition. Prereq: EDUC 481, 482 or ENGL 764, or departmental approval.

757 Composition Studies

Overview of major areas in composition studies (rhetoric and composition, theory and practice, research, and instructional trends).

758 Composition and Rhetoric 3 Introduction to sources and elements of classical rhetoric and their relevance to composition instruction today. Analysis of rhetorical elements, practice writing effective arguments, application to teaching writing.

759 Trends in Writing Instruction 3 Study of trends and movements in education that have influenced and continue to influence writing instruction in secondary schools and colleges in the United States.

760 Graduate Scholarship3Introduction to scholarship in English studies and
to the nature and state of the discipline.

762 Critical Theory3Study of contemporary literary theory and criticism.

764 Classroom Strategies for TA's 3 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.

765 Understanding Electric Culture 3 An exploration of digital culture as a context for understanding specific forms of electronic communication. Prereq: Graduate standing.

770 Studies in American Literature 3 Intensive study of a special period, theme, technique, or group of writers central to the formation, development, or flowering of American literature.

780 Renaissance Literary Studies3Intensive study of a special theme, form, or group
of writers central to the formation and devel-
opment of British literature in the Renaissance
period.

781 18th Century Literary Studies3Intensive study of a special theme, form, or group
of writers central to the formation and develop-
ment of British literature in the 18th century.

782 19th-20th Century British Literature 3 Intensive study of a special theme, form, or group of writers central to the formation and development of recent British literature.

ENTOMOLOGY (ENT)

Brewer, Chair; Boetel, Foster, Glogoza, Harris, Olson, Rider

COURSES

210 Insects, Humans, and the Environment 3 Insect biology and its relevance to humans and the environment. 2 lectures. S (ND:SCI)

350 General Entomology

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

731 Principles of Integrated Pest Management 3 Principles embodied in the implementation of multifaceted tactics designed to successfully manage pest populations. Prereq: ENT 350, STAT 330. S (even years)

732 Plant Resistance to Insects 2 Plant/insect interactions and their applications to plant breeding to increase resistance to pests. Prereq: ENT 350. F (even years)

742 Quantitative Biology 2 Philosophy and techniques for collecting, handling, and interpreting research data in the biological sciences. Prereq: STAT 330. S (odd years)

750 Systematic Entomology5Introduction to systematic methods and principles; identification of common families of insects.Prereq: ENT 350. F (even years)

751 Immature Insects3Characteristics of the immature forms of the orders and principal families of insects. Prereq: ENT750. F (odd years)

760 Insect Structure 4 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)

761 Insect Physiology4Function of major insect organ systems and me-
tabolism, growth, and molting of insects. Prereq:
ENT 350, CHEM 260. S (odd years)

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

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, or instructor approval. S (even years)

ENVIRONMENTAL AND CONSERVATION SCIENCES (ECS)

Saini-Eidukat

COURSES

750 Environmental Decision Analysis

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

Introduction of major federal and state statues and regulatory programs that governs environmental quality, pollution control and wildlife management, including legislative enactment, regulatory development, enforcement, federal/state relationship and judicial interpretation.

FOOD SAFETY (SAFE)

Chakraborty, Coleman, Garden-Robinson, Gibbs, Haggart, Hall, Horne, Jensen, Khaitsa, Lardy, Logue, Marchello, Nganje, Panigrahi, T. Sellnow, Stack, Wolf-Hall

COURSES

450/650 Food Safety for the Food Industry and Consumers

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. SS

452/652 Food Laws and Regulations3Regulations, laws, and dynamics governing development of food policy. Prereq: SAFE 470.Cross-listed with CFS and AGEC.

464/664 [460/660] Etiology/Foodborne Illness

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: BIOL 202, 202L. Cross-listed with MICR. SS

470/670 Economic Epidemiologic and Regulatory Issues in Food Safety

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. SS

474/674 Epidemiology

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Study of the distribution and dynamics of disease in populations. Prereq: STAT 330, SAFE 470. Crosslisted with MICR.

484/684 [480/680] Food Safety Practicum

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. Coreq: SAFE 450, 464, 470. Cross-listed with MICR. SS

485 Crisis Communication3See 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. Three lectures. Prereq: SAFE 470/670,AGEC 741. Cross-listed with AGEC.

725 Food Policy

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Provides quantitative tools and models used to analyze general food safety policies. Three lectures. Prereq: SAFE 470/670. Cross-listed with CFS and AGEC.

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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. Three lectures. Prereq: MICR 653 or 660L, SAFE 684. Cross-listed with CFS and MICR.

762 Advanced Pathogenic Bacteriology3See Microbiology for description.

785 Advanced Crisis Communication

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

Explores the relationship between communication strategies and risk perception, assessment, and management. Prereq: Instructor approval. Cross-listed with COMM.

FRENCH (FREN)

Homan, Chair; Hageman, Saar

COURSES

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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 or equivalent. 201:(ND:HUM)

311, 312 French Conversation and Composition I, II

Advanced practice to develop greater proficiency in oral and written skills through the study of cultural and literary readings. Prereq: FREN 202 or equivalent.

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315 Introduction to French Civilization

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

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

Study of works by French women writers of different literary periods; portrayal of women by French male and female authors.Taught in English; counts toward French major/minor; counts toward Women's Studies minor.

381 Masterpieces of French Literature in Translation

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

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 17th and 18th Century French Literature 3 Literature of le grand siecle, the Enlightenment, and the pre-Revolutionary years. Taught in French. Prereq: FREN 312. (alternate years)

412 19th and 20th Century French Literature 3 From 19th century Romanticism, Naturalism, and Symbolism to the literature of modern France. Taught in French. Prereq: FREN 312. (alternate years)

489 Senior Thesis

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, Ashworth

COURSES

151 Human Geography (CCN)

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)

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)

Spatial approach to the development of the United States and Canada, which stresses changing cultural landscapes and assessing impacts of planning for resource utilization.

455/655 Introduction to Geographic Information Systems

Introduction to basic concepts of geographic information systems and their applications to various spatial problems. Lectures and laboratories.

456/656 Advanced Geographic Information Systems

Advanced methods in Geographic Information Systems development and technology. Continuation of GEOG 455/655, focusing on vector data structures, spatial analysis, and spatial decision support systems. Comprehensive lab assignments included to give students hands-on experience solving problems with state-of-the-art software. Prereq: GEOG 455/655.

GEOLOGY (GEOL)

Saini-Eidukat, Chair; Ashworth Hatzenbuhler, Lepper, Schwert

COURSES

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105, 105L Physical Geology, Lab (CCN)3,1Study 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)

Introduction to the Earth through time; its origin, history, and evolution of animal and plant life. (ND:LABSC)

300 Environmental Geology

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

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, departmental approval.

302 Black Hills Field Course

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, departmental approval.

303 Paleontology Field Course

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, departmental approval. (alternate years)

304 Eastern North Dakota Field Course

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, departmental approval.

350 Invertebrate Paleontology

Survey of invertebrate fossils emphasizing systematics, environments and as stratigraphic markers. Prereq: GEOL 106, 106L. (alternate years)

410 Sedimentology/Stratigraphy

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

Land forms and the processes by which they are formed and modified. 3 lectures, 1 two-hour laboratory. Prereq: GEOL 105, 105L.

413/613 Glacial Geology

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Origin and operation of glaciers; geological work of glaciers, history of glaciations with emphasis on those of the Pleistocene Epoch. Offered periodically. Prereq: GEOL 105, 105L, Junior standing.

414/614 Hydrogeology See department for description.

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

Identification and classification of minerals using morphology, physical properties, XRF and XRD. Coreq: GEOL 420/620. (alternate years)

422/622 Petrology

Principles of igneous and metamorphic petrology including geochemistry, phase relations, and rock forming processes. Prereq: GEOL 420/620. (alternate years)

423/623 Petrography

Identification and classification of rocks in hand specimens and thin sections. Optical mineralogy. Field and laboratory projects required. Prereq: GEOL 422/622. (alternate years)

428/628 Geochemistry

Introduction to geochemistry: chemistry of the Earth, groundwater, isotopes, global geochemical cycles, geochemical modeling, and environmental geochemistry. Prereq: CHEM 121 or 150. Crosslisted with CHEM. (alternate years)

440/640 Quaternary Biology

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. Offered periodically. Prereq: GEOL 106, 106L or departmental approval.

450/650 Field Geology

Interpretation of geology in the field; preparation of base maps and plotting geological data. Lectures and one-week fieldwork. Fee required. Prereq: GEOL 410, 421/621, 423/623, 457/657. (alternate years)

457/657 Structural Geology

Dynamics of rock deformation and analyses of Earth structure. Prereq: GEOL 105, 105L, trigonometry, geometry. (alternate years)

460/660 Biogeochemistry

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. Prereq: GEOL 105, 105L, 106, 106L, CHEM 121, 122, BIOL 150, 151.

760 Advanced Biogeochemistry

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. 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 or equivalent. 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 or equivalent.

HEALTH, NUTRITION AND **EXERCISE SCIENCE (HNES)**

Strand, Chair; Albrecht, Ary, Barney, Barnhart, Driscoll, Edwards, Garden-Robinson, Hadley, Hansen, Liguori, Maughan, McLeod, Pleban, Rhee, Terbizan, Winters

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COURSES

HPER 100 Concepts of Fitness and
Wellness (CCN) 2
Facts about exercise and physical fitness.
110 Introduction to Health,
Physical Education, and Recreation 1
Introduction to career opportunities and require- ments within the profession. Investigation of the various majors in health, physical education, and recreation. Coreq: HNES 150, 160, 170, 180, or HPER 200.
111 [F&N] Wellness 3
Examination of personal lifestyle choices related
to emotional, nutritional, and mental well-being. 3

ated g. 3 lectures.

112 Activity II

Basic techniques and practice of individual and dual sports activities.

113 Activity III Basic techniques and practice of team sports.

114 Racquetball Basic techniques and practice of racquetball.

115 Bowling Basic techniques and practice of bowling.

117 Judo Basic techniques and practice of judo.

118 Tae Kwon Do II See department for description.

119 Beginning PADI Open Water Scuba Beginning level scuba skills. Continuing Education course.

120 Swimming I	1
Technique and practice in Levels I-IV of	the
American Red Cross Swimming Program.	

121 Swimming II

American Red Cross Level V-VII advanced level swimming techniques and practice. Prereq: HNES 120 or swimming proficiency.

122 Advanced PADI Open Water Scuba

Advanced level scuba skills. Continuing Education course.

125 Folk and Square Dance

Basic techniques and practice of folk dances of selected countries.

126 Social Dance

Basic techniques and practice of social and ballroom dance forms such as foxtrot, waltz, jitterbug, polka, schottische, and Latin American dances.

129 Aerobic Dance

Basic techniques and practice in aerobic exercise and dance activities.

141 [F&N 362] Food Sanitation

Principles of safe food handling practices designed for foodservice operators, CD-ROM format. Includes Food Safety Managers' Certification.

150 Foundations of Physical Education

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.

152 Professional Preparation in Middle School Activities

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Instruction of various fundamental movements for middle school students. Students will be exposed to such activities as team sports, outdoor activities, intermediate movements skills, and games. Prereq: HNES 110, 150.

153 Professional Preparation in **High School Activities**

Instruction in the fundamentals of teaching high school physical education activities. Prereq: HNES major or minor.

154 Professional Preparation in Elementary School Activities

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

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

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 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.

HPER 200 Introduction to Parks and

Recreation (CCN)

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Introduction to the professions in leisure studies and community recreation. Coreq: HNES 110.

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210 Human Sexuality

See Psychology for description.

HPER 210 First Aid and CPR (CCN)

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

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

See Psychology for description.

HPER 217 Personal and Community Health (CCN)

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. Prereq: HNES 121 or swimming proficiency.

225 Camp Management and Outdoor **Recreation Skills**

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

Rules and techniques of officiating selected sports.

240 Emergency Response

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 (CNN) Current nutrition facts and philosophy as a basis for meeting nutritional needs in a changing society. 3 lectures.

250 [F&N] Nutrition Science 3

Scientific principles of nutrition based on chemical structure and function of the nutrients. 3 lectures. Prereq: CHEM 117 or 121.

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251 [F&N 352] Nutrition, Growth, and Development

Examination of growth and nutrient needs through the lifecycle. Prereq: NUTR 240 or HNES 250.

253 [251] 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 110, 150, 152, 153, 154.

260 Athletic Training Medical Terminology 1 Medical terminology related to athletic training and other allied health professions.

261 [F&N] Food Selection and

Preparation Principles

Scientific principles underlying food selection, preparation, and preservation; integration of nutrition principles, food standards, cost comparisons, and new food developments. 3 lectures. Prereq: CHEM 117 or 121.

261L [F&N 262] Food Selection and

Preparation Principles Laboratory 2 Illustrates and extends lecture topics and stresses practical application of scientific food preparation principles. 2 three-hour laboratories. Coreq: HNES 261.

270 [F&N 319] Consumer Issues in

Food and Nutrition

Current developments in food and nutrition recommendations and consumer related concerns. 3 lectures.

271 Techniques of Strength and Conditioning

The course presents strength training and conditioning theory and practice. Explored are principles of strength and conditioning, periodization models and their utilization, mastery and analyses of different exercises, and program design and implementation for general/athletic/ special populations. Prereq: HNES 170.

272 [270] Techniques of Cardiovascular Conditioning

Understanding the techniques of conditioning the cardiovascular system. Types of conditioning explored: walking, jogging, spinning, aerobic dance, step aerobics, bench programming, cardiokickboxing, TaeBo, and other popular types of programming.

276 Professional Observation

Observation in a setting providing established health-fitness services. Prereq: HNES 170, 272.

280 Sport Safety Training

Basic first aid and CPR skills and information needed to care for sports related injuries.

281 Injury Recognition and Evaluation of the Lower Extremity

Injury recognition, treatment, management, and evaluation of the lower extremity. Prereq: BIOL 220, 220L, 221, 221L.

282 Athletic Training Terminology and Equipment

Medical terminology related to athletic training and proper methodology used in the fitting, maintenance, and operation of athletic training equipment. Prereq: HNES 181.

284 Clinical Experience I

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Clinical proficiencies and clinical experience hours. Prereq: 30 hours observation in athletic training room setting.

285 Clinical Experience II

Clinical proficiencies and clinical experience hours. Prereq: HNES 284.

286 Injury Recognition Laboratory

Introduction to athletic injury assessment. Practical application of topics discussed in HNES 281 lecture. Coreq: HNES 281.

300 [252] Curriculum, Standards, and Assessment in Physical Education

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 110, 150, 152, 153, 154,253.

302 Water Safety Instruction

Methods of teaching swimming and water safety. Meets American Red Cross standards. Prereq: HNES 121 or swimming proficiency.

326 Recreation Programming

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 or departmental approval.

330 [ATHL] Coaching Football

Rules, theory, principles, and fundamentals of coaching football. Prereq: Knowledge of the sport.

331 [ATHL] Coaching Basketball

Rules, theory, principles, and fundamentals of coaching basketball. Prereq: Knowledge of the sport.

332 [ATHL] Coaching Track and Field

Rules, theory, principles, and fundamentals of coaching track and field. Prereq: Knowledge of the sport.

333 [ATHL] Coaching Wrestling

Rules, theory, principles, and fundamentals of coaching wrestling. Prereq: Knowledge of the sport.

334 [ATHL] Coaching Baseball and Softball 2 Rules, theory, principles, and fundamentals of coaching baseball and softball. Prereq: Knowledge of the sport.

335 [ATHL] Coaching Volleyball

Rules, theory, principles, and fundamentals of coaching volleyball. Prereq: Knowledge of the sport.

336 Methods of Coaching

Provides information necessary to coach at any level from elementary to college. Includes broad overview of the philosophy, methodology, and management of sport.

340 [F&N 450/650] Community

Health Nutrition 3 Need for and objectives of nutrition education; assessing needs of the community; experience

teaching nutrition in the community. 2 lectures, 1 four-hour laboratory. Prereq: HNES 251.

341 Psychosocial Aspects of Health

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 or instructor approval.

345 Materials and Concepts of Health Education

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.

350 Fitness Education Activities and Materials

Topics related to teaching concepts-based fitness in high school physical education. Prereq: HNES 253, 300, 367.

351 [F&N] Metabolic Basis of Nutrition Biochemical and physiological principles of hu-

man nutrition. Nutrients in relation to metabolic regulation. 4 lectures. Prereq: HNES 250, CHEM 240, BIOC 260 or 460.

352 [351] Physical Education Activities and Materials

Study of physical education activities and materials that physical education majors and minors will use in EDUC 481. Prereq: HNES 253, 300, 367.

354 [F&N] Introduction to Medical

Nutrition Therapy 3 Introduction to the role and skills in nutritional care and application of skills necessary for beginning competency as a clinical dietitian. 3 lectures. Coreq: HNES 251, 351.

354L [F&N 355] Introduction to Medical Nutrition Therapy Laboratory

Supervised practice in dietetics in a health care setting. 1 four-hour laboratory. Prereq: HNES 251, 351. Coreq: HNES 354.

355 International Health

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.

361 [F&N] Food Production Management Principles and methods of purchasing, production, and management for quantity foodservice operations. 3 lectures. Prereq: HNES 261, 261L.

361L [F&N 462] Food and Production Management Laboratory

Principles and methods of purchasing, production, and management for quantity food service operations. 1 four-hour laboratory. Coreq: HNES 361.

365 Kinesiology and Biomechanics 3 Study of movement analysis with emphasis on anatomical, biomechanical, and physical principles. Prereq: BIOL 220, 220L, 221, 221L.

366 Kinesiology and Biomechanics Laboratory

Bone and muscle identification, muscle attachments and actions. Coreq: HNES 365.

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367 Principles of Conditioning

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, 221, 221L.

381 Injury Recognition and Evaluation

of the Upper Extremity Injury recognition, treatment, management,

and evaluation of the upper extremity. Prereq: HNES 281.

382 Injury Recognition and Evaluation of the Head, Neck and Spine

Injury recognition, treatment, management, and evaluation of the upper extremity. Prereq: HNES 281, 381.

383 Psychosocial Aspect of the Injured Athlete

Intervention and counseling concepts that prepares the athletic trainer to handle the emotional aspect of the injured athlete. Prereq: HNES 281.

384 Therapeutic Exercise

Planning and implementing a comprehensive rehabilitation program of athletes with injuries/illnesses. Prereq: HNES 281.

385 Therapeutic Modalities

Practical use of various therapeutic modalities used in treating athletic injuries. Emphasis on physiological effects, indications, and contradictions of each form of treatment. Prereq: HNES 384.

386 Clinical Experience III

Clinical proficiencies and clinical experience hours. Prereq: HNES 285.

387 Clinical Experience IV 3 Clinical proficiencies and clinical experience hours. Prereq: HNES 386.

420 Needs Assessment and

Program Planning in Health Education 3 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.

426 Parks and Recreation Administration

3 Topics include marketing, planning, organizing, directing, coordinating, reporting, and budgeting in parks and recreation programs. Ethics, policy making, and philosophy issues are also discussed. Prereq: HPER 200 and Junior standing or departmental approval.

427 Leisure and Society

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.

429 Recreation Internship

Capstone course for recreation management majors. Supervised professional internship in an approved parks and recreational setting.

430/630 Psycho-Social Aspects of Physical Activity and Sport

In-depth appreciation of individual difference factors that affect a person's psyche and behavior in sport and physical activity context. Emphasis on social-environment factors that influence a participant's behavior in sport and physical activity.

434 [435] Organization Management of Sports Teams

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Principles, policies, procedures, and organization of sports teams. Prereq: Senior standing.

435/635 [F&N] Nutrition, Disease, and Health Professional

Principles of client assessment and care that reflect recent advances in nutrition management together with their application to practice. Prereq: HNES 250.

440 [F&N] Nutrition Education and **Counseling Skills**

Nutrition education for groups and individuals in clinical and community settings. Includes counseling theory; educational needs assessment; and implementation, evaluation, and documentation of learning activities. Prereq: HNES 251, 354.

441 [440] Health and Safety Services

American Heart Association and American Red Cross instructor's course in responding to emergencies. Prereq: HPER 210 or HNES 240.

445 Organization and Administration of

Coordinated School Health Programs 3 Examination of coordinated school health programs (CSHP). Analysis of the components of and approaches to development of CSHP. Emphasis on skills required for entry-level health educators. Prereq: HNES 345.

452/652 [F&N] Nutrition, Health, and Aging Physiological changes with aging and their relationship to food habits and nutritional need. Common nutritional health problems with emphasis on prevention and treatment. 3 lectures. Prereq: NUTR 240 or HNES 250.

453 [F&N] Food and Dairy Microbiology See Microbiology for description.

455/655 [F&N] Sports Nutrition

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 250 or 465.

458/658 [F&N] Advanced Medical Nutrition Therapy

Principles in the nutrition care of patients with conditions requiring nutrition care. 4 lectures. Prereq: HNES 354.

458L [F&N 459] Advanced Medical Nutrition Therapy Laboratory

3 Supervised practice for CP students in nutrition care to accompany HNES 458.1 eight-hour laboratory. Coreq: HNES 458/658.

460 [F&N] Foodservice Systems

Role of foodservice in today's society. Application of administration concepts in foodservice operation including equipment, layout, marketing, and budget management. 3 lectures. Prereq: HNES 361, 361L.

460L [F&N 461] Foodservice Systems Laboratory

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Supervised practice for CP students in foodservice to accompany HNES 460. 1 six-hour laboratory. Coreq: HNES 460.

461 [460] Administrative and Social

Aspects of Physical Education and Athletics 3 Study of administrative principles and social aspects that influence the development of physical education and athletic programs. Prereq: HNES 350, 352, Senior standing.

465 Physiology of Exercise

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, 366.

466 Physiology Exercise Laboratory 1

Laboratory exercises to test aerobic and anaerobic capacity, strength, body composition, dietary analysis. Coreq: HNES 465.

467 EKG Monitoring Physiology 2

EKG monitoring and interpretation. Prereq: HNES 465, 466.

470 Activity Benefits and **Exercise Prescription**

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Evaluation of the benefits of physical activity to health and well-being. Discussion of the development of exercise prescription for individuals with special medical problems.

471 Fitness Programming and Management 3 Development and implementation of health promotion programs in a worksite setting. Prereq: HNES 470.

472 Exercise Testing and Application 3 Physiological testing procedures applicable to physical activity settings. Coreq: HNES 467.

475 Human Performance and Fitness Internship

12 Capstone course for human performance and fitness majors. Supervised field work in a professional setting with emphasis on administration, supervision, and program leadership.

480 [F&N] Dietetics Practicum

(Capstone Experience)

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.

481 [F&N] Didactic Capstone Course 2

Capstone for Dietetics majors in the Didactic program in Dietetics.

482 Community Health Internship 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, departmental approval.

486 Medical Aspects of Athletic Training 3 Physicians from around the area will present information on a variety of illnesses and conditions that may affect the athlete. In addition, the student

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will be introduced to pharmacology competencies. Prereq: HNES 281.

487 Administration of Athletic

Training Programs

Planning, coordinating, and supervising all administrative components of an athletic training program.

488 Clinical Experience V

Clinical proficiencies and clinical experience hours. Prereq: HNES 387.

489 Athletic Training Capstone Experience

Capstone experience providing students the opportunity to deliver athletic training care in an off-site setting under the direct supervision of a member of the certified athletic training staff. Prereq: HNES 488.

701 Administrative Leadership in HNES

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.

702 Sport Marketing and **Public Relations in HNES**

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.

703 Scientific Aspects of Sport

Essentials of physical training and biomechanical analysis in sport.

704 Psychological Foundation of Sport & Physical Activity

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

Directed readings and class discussions of recent literature, steps involved in problem solving, and critical analysis of research in the field. F

711 Physical Education Curriculum

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

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

Comprehensive state-of-the-art review of the current knowledge of the physiological responses to exercise.

714 Legal Liability in HNES

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

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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

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

This course is designed to help students understand and develop skills for health promotion programming, regardless of settings.

722 Epidemiology

Course will focus on epidemiological concerns relevant to public health and medicine, including descriptive and analytic epidemiology, measures of association, study design, and interpretation of data.

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

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, HNES 250, or instructor approval.

725 Funding Issues in Nutrition

Course addresses areas of program funding, including grant preparation, writing and critiquing of proposals, and budget planning. Reimbursement issues including Medicare's interim and prospective payment systems and audit requirements. Prereq:Admission to program, statistics.

726 Nutrition in Chronic Disease

Course will address the epidemiology and pathophysiology of chronic disease related to nutrition. Nutritional risk and protective factors will be examined as they relate to public health and individual nutrition. Prereq: Nutrition science, physiology, statistics.

727 Physiology of Physical Activity and Wellness

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 [F&N] Human Digestion and Metabolism

Physiological and biochemical aspects of human digestion and metabolism. 4 lectures. Prereq: HNES 351, BIOC 701.

754 [F&N] Assessment in Nutrition and Exercise Science

Techniques to assess nutritional status, physical fitness status, and how to interpret the information received

HISTORY (HIST)

Peterson, Chair; Anderson, Danbom, Harvey, Helgeland, Isern, Justitz, Norris

COURSES

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101 Western Civilization I (CCN)

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)

Survey of United States history to 1877, emphasizing major political, economic, social, and cultural developments. (ND:HIST)

104 U.S. Since 1877 (CCN)

Survey of United States history since 1877, emphasizing major political, economic, social, and cultural developments. (ND:HIST)

135 Race in U.S. History

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)

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) 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)

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)

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)

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)

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)

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265 Families in America (CCN) 3 Varieties of family experiences in America from European colonization to the present. 268 Rural America (CCN) 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 [267] 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 [290] 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, foot-

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.

noting, and copyediting.

403/603 [253] 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.

404/604 Historical Editing 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.

410/610 U.S. Intellectual History I 3 American intellectual trends in areas such as religion, education, racism, science, feminism; social and political thought; 1600-1860. Prereq: HIST 103, 104.

411/611 U.S. Intellectual History II American intellectual trends in areas such as religion, education, racism, science, feminism; social and political thought; 1860-present. Prereq: HIST 103, 104.

422/622 U.S. History 1829-1917 I 3 Political, social, and economic history of the United States 1829-1877; emphasizing socioeconomic change, the Sectional Crisis, the Civil War, and Reconstruction.

423/623 U.S. History 1829-1917 II 3 Political, social, and economic history of the United States 1877-1917; emphasizing industrialization, urbanization, and progressive reform.

424/624 U.S. History 1917-Present I 3 Political, social, and economic history of the United States 1917-1960; emphasizing the New Deal, the world wars, and the Cold War era.

425/625 U.S. History 1917-Present II 3 Political, social, diplomatic, and economic history of the United States since 1960; emphasizing foreign policy, domestic developments, and socioeconomic change.

431/631 The North American Plains 3 Historical treatment of the Great Plains of North America as an international region, comprising the Canadian prairies and the American plains.

434/634 History of Environmental Science 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 19th century.

436/636 American Frontier to 1850 3 Early American frontier from 1500s to mid-1800s, emphasizing Indian-White relations, colonial wars, social life in the backcountry, and exploration and settlement.

437/637 American West Since 1850 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.

439/639 History of American Agriculture 3 American agriculture from its Native American and European roots to the present.

440/640 European Intellectual History I 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.

450/650 Ancient History Cultural, political, economic, and social history of the ancient Near East, Greece, and Rome.

451/651 Medieval History 3 Cultural, political, economic, and social history of the Middle Ages.

454/654 Renaissance and Reformation

Political, social, and economic history of continental Europe from 1400 to 1650; with a focus on Renaissance and Reformation.

455/655 The Eighteenth Century

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Political, social, and economic history of continental Europe from 1650 to 1815; with a focus on Enlightenment and French Revolution.

456/656 Europe 1815-1914 3 Political, social, and economic history of Europe from the defeat of Napoleon to outbreak of World War I.

457/657 Europe Since 1914 3 Political, social, and economic history of Europe including World War I, the Russian Revolution, Nazism, World War II, and the postwar era.

460/660 History of England I 3 England from ancient times to the Hanoverian Succession (1714); emphasis on the Middle Ages and the Tudor-Stuart period.

461/661 History of England II 3 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.

466/666 History of Russia I Cultural, diplomatic, intellectual, and political history of Russia; evolution of the Russian state, expansion of Imperial Russia, Great Reforms, populism, and socialism.

467/667 History of Russia II 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.

470/670 Modern Latin America I 3 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 19th century.

471/671 Modern Latin America II 3 Study of important social, economic, political, and cultural developments in Latin America from the late 19th century through the modern epoch.

473/673 Mexico I 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.

474/674 Mexico II

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Study of the important social, economic, political, and cultural developments in Mexican history from independence in 1821 through the contemporary era.

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476/676 Southwestern Borderlands to 1848 3 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.

480/680 Recent East Asia I 3 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.

481/681 Recent East Asia II

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.

489 Senior Seminar

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.

701 Methods of Historical Research

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.

702 Historiography

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.

705 Directed Research

Directed research on the student's thesis prospectus. Taken close to the end of the student's course work. Prereq: HIST 701, 730, and 760 or 780.

706 Seminar in the Teaching of History 1-4 Includes methods appropriate to college-level teaching. Class consists of discussion, demonstration, and practice. S/U grading only.

710 Research Seminar in North American History

American History3This 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.

712 Research Seminar in European History 3 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.

714 Research Seminar in World History

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.

730 Readings in North American History 3 A historiographical survey of a selected topic in North American history. Topics vary by semester. May be repeated. Coreq: HIST 701.

760 Readings in European History

Historiographical survey of a selected topic in European history. Topics vary by semester. May be repeated. Coreq: HIST 701.

780 Readings in World History

Historiographical survey of a selected topic in World history. Topics vary by semester. May be repeated. Coreq: HIST 701.

HONORS (HON)

Homan, Coordinator

COURSES

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386 World Literature: Imaginary Homelands 3 Reading and discussion of works from literatures around the world, including philosophical nonfiction, emphasizing the diversity of responses to the human condition. Prereq:Admission to Honors Program or departmental approval.

489 Senior Thesis

Primary research or creative activity under the guidance of a faculty member. Prereq: Departmental approval.

HUMAN AND COMMUNITY EDUCATION (H&CE)

Miller-Boschert, Wilhelm

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 and Presentation Techniques (CCN)

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

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) See Education for description.

444 Planning the Community Program in Agricultural Education

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

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

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 or departmental approval.

469 Housing Education and Issues

Issues, curricula, and techniques for teaching and evaluating K-12 and adult housing programs.

474 Extension Internship

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Supervised full-time family and consumer sciences extension internship in an approved location. Prereq: H&CE 345.

481/681P Methods of Teaching Agriculture

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

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

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 321, 322, 381, 389/489/689P, 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

Supervised teaching in an approved and accredited school. Includes an on-campus seminar. Prereq: EDUC 321, 322, 381, 389/489/689P, 451/651P, 486/686P, H&CE 232, 341, admission to School of Education. For AGED: H&CE 444, 481/681P. For FACS: H&CE 468, 482/682P. Coreq: H&CE 483/683P.

724 Program Development in Vocational Education

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

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

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

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,

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148 Course Descriptions

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

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

Prereq: Graduate standing.

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 Education1-3Continued professional development in technicaland pedagogical subjects of current importancefor 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 Success1SeeUniversityInterdisciplinaryStudiesfordescription.

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

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. Prereq: Graduate standing.

HUMANITIES (HUM)

Cater (Emeritus), Flood, Laliberte

COURSES

256 Questions of Philosophy3Introduction to philosophy, some of its majorproblems and personalities.

257 Traditional Logic

Study of the art and science of critical thinking; scientific method emphasized. Cross-listed with PHIL.

304 Humanities Tutorial

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 Greek Philosophy

The philosophies of Plato and Aristotle as perennial philosophies. Cross-listed with PHIL.

358 Early Medieval Philosophy

Examination of the main philosophical worldviews of the first millennium with an emphasis on Neo-Platonism. Prereq: Junior standing.

359 Thomas Aquinas

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The philosophy of Thomas Aquinas as a perennial philosophy. Prereq: Junior standing. Cross-listed with PHIL.

366 Metaphysics

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

Philosophical study of the foundations of human actions, virtue, and vice.

371 The Law and the Prophets

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

Study of special themes in Wisdom and Apocrypha. Introduction to principal New Testament authors.

385 Comparative Arts3Study of Western arts in light of the aesthetic, so-
cial, and philosophical ideas that nurtured them.

476 Kant and Hegel

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Principles of Kant and Hegel philosophies in the context of 18th and 19th century thought and society. Prereq: Departmental approval. Cross-listed with PHIL.

477 20th Century Philosophy

Emphasis on themes such as existentialism, process, and the "linguistic turn." Prereq: Departmental approval. Cross-listed with PHIL.

486 Philosophy and Literature

Philosophical elements of selected works from Western literature, such as those of Dante, More, Milton, and Newman. Cross-listed with PHIL.

487 Aesthetics

Principles of aesthetics as revealed by artists, writers, and philosophers. Cross-listed with PHIL.

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

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111 Introduction to Industrial and

Manufacturing Engineering1Introduction 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

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

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310 Survey of Industrial and Systems Engineering Applications

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

Study of arc and gas welding technology together with related metallurgy. Laboratory instruction in welding techniques and skills. 1 recitation, 1 twohour laboratory. F

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380 CAD/CAM for Manufacturing

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

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 audiovisual 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 stateof-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

Presentation of metallurgical failure conditions and analysis methods. Study of airframe and engine component failures. Weekly laboratory. Prereq: ME 223, IME 320. F/2 (even years)

427/627 Electronics Manufacturing

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 or Senior standing. F/2 (odd years)

430/630 Process Engineering

Comprehensive analysis of selected manufacturing processes; development of process flow maps and models of process dynamics, 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

Undergraduate: design of fixtures, dies and tooling for economical production. Graduate: In-depth analysis of production systems for selected manufactured products; development of production system flow maps and linked process dynamic models, evaluation of task time and identification of constraints. Design of alternative solutions for production constraints. Seminar/case study format. Prereq: IME 330. Recommended: IME 430/630. S

432 Composite Materials Manufacturing 3 Processes for manufacturing products from fiberreinforced 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

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Addresses the material properties, process, and devices for the fabrication of parts from plastics. Contrasts and compares to processes for other materials. Coordinated with ME 463 and 464. Prereq: IME 330. Cross-listed with ME. S/2 (odd years)

440/640 Engineering Economy

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.

450/650 Systems Engineering and Management

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

451/651 Logistics Engineering and Management

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)

452/652 Integrated Industrial Information Systems

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

453/653 Hospital Management Engineering 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: Departmental approval, core IME courses. S/2 (even years)

455/655 Management of People Systems

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

456/656 Program and Project Management 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

460/660 Evaluation of Engineering Data

Design of engineering experiments and evaluations, curve fitting, regression, hypothesis testing, ANOVA, Taguchi methods in engineering design. Coreq: MATH 166. F, S **461/661 Quality Assurance and Control 3-4** 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. S

462/662 Total Quality in Industrial Management

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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)

463/663 Reliability Engineering

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)

470/670 Operations Research I

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

472/672 Simulation of Business and Industrial Systems

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

480/680 Production and Inventory Control 3 Planning and controlling of industrial production and inventory: demand forecasting, master scheduling, materials requirements planning, job scheduling, assembly line balancing, and justintime production. Prereq: IME 460/660. F

482/682 Automated Manufacturing Systems 3 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

485/685 Industrial and Manufacturing Facility Design

Capstone integration of analysis and design tools to convert product design into production plans and plants. Prereq: Senior standing, advisor approval. S

489 Manufacturing Engineering Capstone 3 Capstone experience. Student projects in design, analysis, and experimental investigation related to manufacturing. Prereq: Senior standing, advisor approval. S

711 Advanced Human Factors Engineering 3 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)

720 Surface Engineering

Engineering surfaces: structure and properties. Tribology: surface contacts, friction and wear. Surface heat treatment. Solid, liquid and vapor phase deposition processes for tribiological coatings. Emerging processes: nano-engineered and diamond-based coatings. Evaluation and characterization of tribiological coatings. Prereq: Graduate standing in engineering or science. F (odd years)

740 Advanced Engineering Economy

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)

761 Quality Engineering

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)

765 Data Analysis

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: MATH 166, IME 460/660.

770 Advanced Operations Research Topics 3 Study of the theory and applications of linear programming, network flows, and nonlinear programming. Prereq: IME 470/670. F/2 (odd years)

772 Advanced Simulation3In-depth study of special purpose simulation languages to model, analyze, and design industrialand engineering systems. Stochastic and deterministic methods are included. Prereq: IME 472/672. S(even years)

774 Neural Networks	
See CSCI 735 for description.	

780 Advanced Production and Inventory Control

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)

782 Robotics/CAD/CAM/Control Systems 3 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)

784 Computer Integrated Manufacturing 3 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)

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785 Facilities Location

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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.

786 Manufacturing Systems Analysis

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. S

LANDSCAPE ARCHITECTURE (LA)

Walter, Director; Kennedy, Krohn

COURSES

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132 Introduction to Landscape Architecture Studio

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.

171 Environmental Design I	
See Architecture for description.	

172 Environmental Design II See Architecture for description.

231 Landscape Architecture Graphics

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, 172. Coreq: LA 271.

242 [CE 113] Elements of Surveying

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.

271 Landscape Architecture I

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, 172. Coreq: LA 231.

272 Landscape Architecture II

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 231, 271.

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322 History of Landscape Architecture

Global overview of the landscape developments from prehistoric civilizations through the 20th century using styles and trends. Emphasis on analyzing historic places and locations as a problem-solving method.

331 Introduction to Planting Design 2-3

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.

341 Site Development and Detailing I 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: Second-year standing. Prereq for ARCH majors: ARCH 272.

342 Site Development and Detailing II

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.

344 Site Development and Detailing Laboratory

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.

351 Landscape Design

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.

371 Landscape Architecture III

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.

372 Landscape Architecture IV

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.

441 Site Development and Detailing III 3

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.

471 Advanced Landscape Architecture I

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.

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472 Advanced Landscape Architecture II

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.

531 Advanced Landscape

Architecture Planting Design

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)

552 Advanced Landscape Planning

Theories and practices facing landscape architects and planners in the design of urban, suburban, and rural landscapes. Seminar/field trip. Prereq: Senior standing or departmental approval.

561 Landscape Architecture Programming

Discussion and application of a comprehensive design process for production of the capstone design project. Emphasis on preparing a design program. Coreq: LA 571. Cross-listed with ARCH.

571 Advanced Landscape Architecture Design III

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 561.

572 Design Thesis

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 561, 571.

LIBRARY SCIENCE (LIB) COURSE

121 Introduction to Library Research

Basic information on libraries and their services. Exploration of sources of information in print and computer format; explanation of basic search strategies.

MANAGEMENT INFORMATION SYSTEMS (MIS)

Harter, Chair; Altenburg, Latimer, Shi

COURSES

277 [COMM 461] Introduction to UNIX See Computer Science for description.

370 [BUSN] Management

Information Systems

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.

371 [COMM 460] Web Scripting Languages See Computer Science for description.

375 [BUSN] Database Design for Business Application

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.

376 [BUSN] Data and

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Telecommunications Administration3Introduction to a wide variety of topics in the
voice and data communications field. Prereq: MIS
370, CSCI 228.

470 [BUSN] Information Systems

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 370, 376, CSCI 315. Coreq: MIS 375.

770 [BUSN] Information Resource Management

Resource Management 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. Prereq: Departmental approval.

MATHEMATICS (MATH)

Shreve, Chair; Barabanov, Brennan, Calvo, Cömez, Cope, Coykendall, Johnson, Juras, Kornfeld, Martin, Olsen, Staley, Ungar

COURSES

099 Elementary Algebra

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.

102 Intermediate Algebra (CCN)

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 099 or placement test.

103 College Algebra (CCN)

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)

104 Finite Mathematics (CCN)

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)

105 Trigonometry (CCN)

Angle measure, trigonometric and inverse trigonometric functions, trigonometric identities and equations, polar coordinates and applications. Prereq: MATH 103 or placement test.

107 Precalculus (CCN)

Equations and inequalities; polynomial, rational, exponential, logarithmic and trigonometric functions; inverse trigonometric functions; algebraic and trigonometric methods commonly needed in calculus. Prereq: Placement test. **128 [228] Introduction to Linear Algebra**1Systems of linear equations, row operations,

echelon form, matrix operations, now operations, echelon form, matrix operations, inverses, and determinants. Prereq: MATH 105 or equivalent. Credit awarded only for MATH 128 or 129, not both.

129 [229] Basic Linear Algebra

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 equivalent. Credit awarded only for MATH 128 or 129, not both.

146 Applied Calculus I (CCN)

Limits, derivatives, integrals, exponential and logarithmic functions and applications. Prereq: MATH 103 or placement test. (ND:MATH)

147 Applied Calculus II (CCN)

Definite integrals, double integrals, trigonometry, introduction to differential equations, infinite sequences and series, probability and applications. Prereq: MATH 146.

165 Calculus I (CCN)

Limits, continuity, differentiation, Mean Value Theorem, integration, Fundamental Theorem of Calculus and applications. Prereq: MATH 105 or placement test. (ND:MATH)

166 Calculus II (CCN)

Applications and techniques of integration; polar equations; parametric equation; sequences and series, power series. Prereq: MATH 165.

259 Multivariate Calculus

Functions of several variable, 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.

265 Calculus III (CCN)

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.

266 Introduction to Differential Equations (CCN)

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.

270 Introduction to Abstract Mathematics 3 Sets symbolic logic propositions quantifiers

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.

327 Applied Linear

Algebra (CCN)

Systems of linear equations, matrices, and linear programming, numerical applications. Prereq: MATH 103 and 146 or 165.

374 Special Problems in Mathematics1Diverse and challenging mathematical problemsare considered with the intent of preparing the

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student for the Putnam Mathematics competition. May be repeated for credit. Pass/Fail only. Prereq: MATH 270.

376 Actuarial Exam Study 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.

420/620 Abstract Algebra I

Groups, permutations, quotient groups, homomorphisms, rings, ideals, integers. Prereq: MATH 270 or instructor approval.

421/621 Abstract Algebra II 3 Division rings, integral domains, fields, field extensions, Galois Theory. Prereq: MATH 420/620.

429/629 [329] Linear Algebra 3 Vector spaces, linear transformations, eigenvalues and eigenvectors, canonical forms, inner product spaces, and selected applications. Prereq: MATH 270 or instructor approval.

430/630 Graph Theory

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 or instructor approval.

436/636 Combinatorics 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 or instructor approval.

440/640 [445/645 & 340] Axiomatic Geometry 3 Hilbert's axioms for Euclidean geometry, projective geometry, history of parallel axiom, hyperbolic geometry, elliptic geometry. Prereq: MATH 270 or instructor approval.

445/645 [440/640] Differential Geometry 3 Basic properties of curves and surfaces, Frenet equations, the Gauss Map, intrinsic geometry of surfaces, geodesics, Gauss-Bonnet Theorem, and applications. Prereq: MATH 270 or instructor approval.

446/646 Introduction to Topology 3 Topology of Euclidean space, metric spaces, topological spaces, bases and neighborhoods, Hausdorff property, continuity, homeomorphisms and embeddings, connectivity, and compactness. Prereq: MATH 270 or instructor approval.

447/647 Molecular Topology 3 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-Sumners theorem. Prereq: MATH 270 or instructor approval.

450/650 Real Analysis I

Sequences and convergence in R, continuity, uniform convergence, spaces of continuous functions, compactness, fixed point theorems, differentiability, inverse and implicit function theorems, applications. Prereq: MATH 266, 270, or instructor approval.

451/651 Real Analysis II

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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

Complex number systems, analytic and harmonic functions, elementary conformal mapping, integral theorems, power series, Laurent series, residue theorem, and contour integral. Prereq: MATH 265 or instructor approval.

460/660 Intensive Mathematica

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, 265, or instructor approval.

472/672 Number Theory

Properties of integers, number theoretic functions, quadratic residues, continued fractions, prime numbers and their distribution, primitive roots. Prereq: MATH 270 or instructor approval.

478/678 [378] History of Mathematics

Historical considerations emphasizing the source of mathematical ideas, growth of mathematical knowledge, and contributions of some outstanding mathematicians. Prereq: MATH 270 or instructor approval.

480/680 Applied Differential Equations

Power series expansions and the method of Frobenius, special functions and their use (Bessel functions, Legendre polynomials); phase plane analysis. Prereq: MATH 266 or instructor approval.

481/681 Fourier Analysis

Discrete and continuous Fourier transforms, Fourier series, convergence and inversion theorems, mean square approximation and completeness, Poisson summation, Fast-Fourier transform. Prereq: MATH 265 or instructor approval.

482/682 Survey of Mathematical Models

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 or instructor approval.

483/683 Partial Differential Equations

Solution methods for potential, diffusion and wave equations; treatments of homogeneous and nonhomogeneous equations; boundary conditions; separation of variables, Greens' functions, transform techniques. Prereq: MATH 480/680.

488/688 Numerical Analysis I

Numerical solution of nonlinear equations, interpolation, numerical integration and differentiation, numerical solution of initial value problems for ordinary differential equations. Prereq: MATH 266 or instructor approval.

489/689 Numerical Analysis II

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

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Graduate level survey of algebra: groups, rings, fields, Galois theory, and selected advanced topics. Prereq: MATH 421/621 or instructor approval.

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

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 or instructor approval.

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 or instructor approval.

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 or instructor approval.

732 [735] Introduction to Bioinformatics 3 An introduction to the principles of bioinfor-

matics 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 or instructor approval.

746, 747 Topology I, II

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Topological spaces, convergence and continuity, separation axioms, compactness, connectedness, metrizability, fundamental group and homotopy theory. Advanced topics may include homology theory, differential topology, three-manifold theory and knot theory. Prereq: MATH 446/646 or instructor approval.

750, 751 Analysis I, II

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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

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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

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 or instructor approval.

760, 761 Ordinary Differential

Equations I, II

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

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 or instructor approval.

778 Modern Probability Theory See Statistics for description.

780 Methods of Optimization

See Computer Science for description.

781 Mathematical Control Theory

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

Tensor analysis, matrices and group theory, special relativity, integral equations and transforms, and selected advanced topics. Prereq: MATH 429/629 and 452/652 or instructor approval. Cross-listed with PHYS 752, 753.

784, 785 Partial Differential

Equations I, II

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

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.

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788, 789 Numerical Analysis I, II

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)

Jang, Chair; Akhatov, Danescu, Goplen, N. Jazar, Kallmeyer, Karami, Mahinfalah, Mascaro, Mehta, Nazari, Pieri, Stewart, Stone, Wong, Zhong, Ziejewski

COURSES

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189 Skills for Academic Success 1 See University Interdisciplinary Studies for description.

212 Fundamentals of Visual Communications for Engineers 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. F, S

213 Modeling of Engineering Systems

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, 166, ME 222. F, S

221 Engineering Mechanics I

Scaler and vector approaches to trusses, frames and machines, internal forces, friction forces, center of gravity, centroid, and moment inertia. Prereq: MATH 165. F, S, SS

222 Engineering Mechanics II

Dynamics of particles and rigid bodies, work energy, impulse-momentum, principles of conservation of energy and momentum. Prereq: ME 221, MATH 166. F, S, SS

223 Mechanics of Materials

Introduction to stress, strain, and their relationships; torsion of circular shafts, bending stresses, deflection of beams, stress transformations, buckling. Prereq: ME 221. F, S, SS

311 Introduction to Aviation

General introduction to aviation and preparation for FAA examination for Private Pilot License, study of FAA regulations, weather conditions, visual and radio navigation. F, S

312 Introduction to Flight

Instruction in flight procedures, operation of aircraft, and introduction to solo flight. Completion of 15 hours of dual flight instruction required. Coreq: ME 311. F, S

313 Commercial Instrument Ground School 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.

331 Engineering Materials I

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. F,

332 Engineering Materials II

Characterization of properties and processes in metals; diffusion, phase diagrams, phase transformation, creep, wear, corrosion, fracture, and fatigue. Prereq: ME 331. S

341 Mechanics of Machinery

Application of solid mechanics principles and computer methods in designing mechanisms for function and performance. Prereq: ME 213, 222. F

350 Thermodynamics and Heat Transfer 3 Basic concepts, first and second laws of thermodynamics. Introduction to heat transfer principles. Prereq: ME 222. F, S, SS

351 Thermodynamics I

Basic concepts, properties of pure substances and ideal gases. First and second law, entropy, and availability. Prereq: ME 222, MATH 259. F, S

352 Fluid Dynamics

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Foundations of the science of fluid dynamics. Basic concepts including thermodynamic principles applied to fluids. Development of conservation principles and applications. Prereq: ME 351. F, S

353 Thermodynamics II

Continuation of thermodynamics. Cycle analysis, thermodynamic relations, mixtures, chemical reactions, and related topics. Prereq: ME 351. S

412/612 Engineering Measurements* 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. F, S

415 Emerging Technologies in Mechanical Engineering

This course will describe the 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.

421/621 Theory of Vibrations*

Fundamentals of vibrations; free, forced, and damped vibration of single and multiple degrees of freedom systems. Prereq: ME 213, 222, MATH 266. F, S, SS

423 Intermediate Mechanics of Materials 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. F, S

435/635 Plastics and Injection Molding

Manufacturing3See Industrial and Manufacturing Engineering for
description.

442/642 Machine Design I*3Application of engineering mechanics, material
properties, and failure theories to the design of re-
liable machine components. Prereq: ME 331, 423.
E, S

454/654 Heat and Mass Transfer*3Principles of heat transfer by conduction, convection, and radiation. Introduction to mass transfer
principles. Prereq: ME 213, 352, MATH 266. F, S

455 Mechanical Systems Laboratory I 1 Investigation of behavior of fluid flows as well as devices for generating, controlling, and measuring fluid flow. Prereq: ME 352. F, S

456 Mechanical Systems Laboratory II1Investigations, tests, and reports based upon ME353, 454. Prereq: ME353, 454, 455. F, S

461, 462 Design Project I, II 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. 461: F, S; 462: S, SS

463, 464 Plastics Design Project I, II 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.

471/671 Stress Analysis3Coordination of mathematical and modern experimental analysis as applied to engineering materials.Includes laboratory. Prereq: ME 223, 331. S

473/673 Engineering Plastics for Design 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. F

474/674 Mechanics of Composite Materials 3 Materials, properties, stress, and strength analyses; engineering design and manufacturing aspects of short and continuous fiber-reinforced materials. Prereq: ME 423. S

475/675 Automatic Controls3Introduction 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. S

477/677 ME Finite Element Analysis 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. F, S

479/679 Fluid Power Systems Design

Fluid dynamics principles and fluid properties are applied to the study of function, performance, and design of system components and systems for power transmission and control purposes. Prereq: ME 222, 352. F

481/681 Fundamentals of Energy Conversion 3

Introduction to electric power generating systems and their major components such as turbines, boilers, condensers, and cooling towers. Prereq: ME 353. F

484/684 Gas Turbines

Theory and design of gas turbines and components. Prereq: ME 353, 454/654.

485/685 Heating, Ventilation, and Air Conditioning

Application of the basic fundamentals of thermodynamics, heat transfer, and fluid flow to heating, ventilating, and air conditioning. Prereq: ME 353, 454/654, Senior standing. S

486/686 Nanotechnology and Nanomaterials 3 See Civil Engineering for description.

487/687 Internal Combustion Engines3Theory and practice of power and propulsion engines utilizing gas as a working substance. Study of gas turbines, spark, and compression ignition engines. Prereq: ME 353. F

489/689 Vehicle Dynamics

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.S

711 Advanced Engineering Analysis3Mathematical analysis and numerical treatmentofofengineeringproblems, eigenvalueproblemsanddistributedparametersystems,advanced mathematicsadvanced mathematicsapplied toengineeringdesign.Prereq:ME 465 ordepartmentalapproval.F

712 Advanced Finite Element Analysis 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.

717 PC Based Measurements and Controls

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.

720 Continuum Mechanics

See Civil Engineering for description.

721 Advanced Dynamics and Vibrations

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.

722 Mechanics of Deformable Solids

Special problems in theories of failure, contact stresses, thick-walled cylinders, thin tubes, curved beams, energy methods. Prereq: ME 223.

723 Experimental Stress Analysis

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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.

743 Biomechanics of Impact

The course will describe the fundamental sciences of engineering and human anatomy that form the basis of biomechanics of soft tissue and bone under dynamic conditions. Prereq: ME 223 and 331 or instructor approval.

751 Advanced Thermodynamics

Rigorous treatment of thermodynamic principles. Emphasis on the concept of availability methods as applied to various engineering systems. Prereq: ME 353.

753 Gas Dynamics

Fundamental concepts of fluid dynamics and thermodynamics are used in the treatment of compressible flow, frictional flows, and flows with heat transfer or energy release. Prereq: ME 352.

754 Boundary Layer Theory

Fundamental laws of motion of a viscous fluid are derived and used in the consideration of laminar boundary layers, transition phenomena, and turbulent boundary layer flows. Prereq: ME 352.

761 Heat Transmission I

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.

* Courses ME 612, 621, 642, and 654 are not acceptable for credit in graduate programs in Mechanical Engineering (M.S. or Pb.D.).

MICROBIOLOGY (MICR)

Freeman, Chair; Berry, Dyer, Ebert, Gustad, Haggart, Logue, Nolan, Robinson, Rust

COURSES

202, 202L [BIOL] Introductory Microbiology, Lab (CCN) 2, 1

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)

350, 350L General Microbiology, Lab (CCN) 3, 1 Principles of microbiology for students requiring a rigorous professionally oriented course.

352 General Microbiology II

Further exploration of microbiological concepts introduced in MICR 350. Topics include molecular structure, physiology, metabolism, growth and microbial genetics. Prereq: MICR 350.

352L General Microbiology Lab II

Application of principles of microbiology introduced in General Microbiology II using advanced microbiology techniques and tools. Prereq: MICR 350L. Coreq: MICR 352.

363 Clinical Parasitology

Protozoan, helminthic, and arthropodal parasites of humans. Emphasis on clinical identification, life histories, and control. Prereq: BIOL 150, 150L.

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445/645 Animal Cell Culture Techniques

Methods of animal cell culture propagation and uses for cell culture systems.

452/652 Microbial Ecology

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.

453/653 Food Microbiology

Microbiology of preservation, manufacture, and spoilage of food and dairy products from commercial and domestic viewpoints. Prereq: MICR 202L or 350L. Cross-listed with CFS and HNES.

460/660 Pathogenic Microbiology (CCN)

Study of the microorganisms that cause disease and of disease processes. Prereq: MICR 202 or 350.

460L/660L Pathogenic Microbiology

Laboratory (CCN) 2 Isolation and identification of pathogenic microorganisms. Prereq: MICR 350L.

464/664 Etiology/Foodborne Illness See Food Safety for description.

465/665 [VETS 365] Fundamentals of Animal Disease

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.

470/670 Basic Immunology

Principles of immunology, antigen-antibody reactions, and immune response in host. Prereq: MICR 350.

471/671 Immunology and Serology

Laboratory

Basic immunological and serological procedures. Prereq: MICR 350.

474/674 Epidemiology

See Food Safety for description.

475/675 Animal Virology

The biology of animal viruses with emphasis on virus replication and pathogenesis. Prereq: MICR 350.

480/680 Bacterial Physiology

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, BIOC 460.

482/682 Bacterial Genetics and Phage 3 Principles of bacterial genetics and phage-host relationships. Prereq: MICR 350, BIOC 460.

484/684 Food Safety Practicum	
See Food Safety for description.	

486 Capstone Experience in Microbiology Capstone experience to integrate the principles of microbiology with the development of skills in experimental design and scientific discourse. Prereq: Senior standing.

561 Microbiology Laboratory for Pharmacy 1 Students are exposed to laboratory procedures currently used in clinical microbiology laboratories.

572 Clinical Immunology

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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.

750 Advanced Topics in Epidemiology See Food Safety for description.

752 Advanced Food Microbiology See Food Safety for description.

762 Advanced Pathogenic Bacteriology Biophysical and biochemical mechanisms by

which microorganisms cause infectious disease and hot reactions to the disease. Prereq: MICR 460, equivalent, or instructor approval. Cross-listed with SAFE

770 Immunology of Chronic Infections

A study of chronic infections, including pathogens involved, mechanisms of host immunity, and economic and social importance of these organisms. Prereq: MICR 470/670.

781 Advanced Bacterial Physiology

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.

782 Molecular Microbiological Techniques

Familiarize students with current molecular and immunologic strategies and techniques commonly used to study infectious disease processes. Prereq: BIOC 460, 461, 474, MICR 471.

783 Advanced Bacterial Genetics and Phage 3 Mechanisms of genetic rearrangement and regulation in bacteria and phage. Recombinant DNA. Prereq: MICR 482/682.

785 Pathobiology

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.

MILITARY SCIENCE (MS) (ARMY ROTC) Cranford, Chair; Joyce

COURSES

101 [111] Foundations of Officership

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

102 [112] Basic Leadership

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

110 Army ROTC Physical Fitness

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

114 Basic Pistol Marksmanship

Fundamentals of military pistol marksmanship techniques, firearms safety, range safety, marksmanship programs, and methods of instruction.

115 Basic Rifle Marksmanship

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Fundamentals of military rifle marksmanship techniques, firearms safety, range safety, marksmanship programs, and methods of instruction.

201 [211] Individual Leadership Studies 2

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. Prereq: Departmental approval. Coreq: MS 310. F

202 [212] Leadership and Teamwork

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. Prereq: Departmental approval. Coreq: MS 310. S

213 Basic Camp: Camp Challenge

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.

214 United States Military History

Overview of all United States military operations with emphasis on technology, leadership, strategy, tactics, and logistics of several selected campaigns.

301 [311] Leadership and Problem Solving 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. Prereq: Departmental approval. Coreq: MS 310. S

302 [312] Leadership and Ethics

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. Prereq: Departmental approval. Coreq: MS 310. F

156 Course Descriptions

310 Leadership Laboratory

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. Coreq: MS 310. F

313 Advanced Camp

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. Prereq: MS 311 or 312.

320 Leadership Laboratory 1 Small unit drill, as well as tactical application of leadership fundamentals at the squad/patrol leader level. S

401 [411] Leadership and Management3Plan, conduct, and evaluate activities of the ROTCcadet organization. Articulate goals, put plans intoaction. Introduce staff organization and processes.Assess organizational cohesion and develop improvement strategies. Apply Army policies. Prereq:Departmental approval. Coreq: MS 410.

402 [412] Officership3Continuation of planning, conducting, and
evaluating activities of the ROTC cadet orga-
nization. Articulate goals, put plans into action.
Introduce staff organization and processes. Assess
organizational cohesion and develop improve-
ment strategies. Apply Army policies. Prereq:
Departmental approval. Coreq: MS 420.

410 Leadership Laboratory 1 Assumption of command and staff positions within the cadet battalion. F

420 Leadership Laboratory 1 Assumption of command and staff positions within the cadet battalion. S

MODERN LANGUAGE (LANG)

Uniform numbered course offerings initiated by the department.

MUSIC (MUSC)

Froelich, Groves, Jones, Mack, Jo Ann Miller, John Miller, Mueller, Olfert, Patnode, Schneider, Thrasher, Weber

COURSES

101 Fundamentals of Music (CCN)3Introduction to fundamental elements of musicthrough the study of scales, chords, basic harmon-ic progressions, rhythms, and terminology.

103 Introduction to Music History (CCN)3Introduction to the major works of music in theWestern tradition that define the stylistic elementsof musical periods in history. (ND:HUM)

104 Introduction to Music Literature to 1825 (CCN)

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)

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, II3 eachIntroduction to the compositional practices of the18th and 19th centuries. Prereq for 131: MUSC130. 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

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Survey of the history of symphonic literature with emphasis on selected works. Prereq: MUSC 140, ability to read music.

142 Operatic Literature

Survey of the history of opera with emphasis on selected works. Prereq: MUSC 140, ability to read music.

143 Keyboard Literature

Survey of keyboard styles, instrumental development, and literature (excluding organ) from the early 14th century through the 20th 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.

Applied Music

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Private lessons. Prereq: Qualifying examination in performance.

Applied Piano 165, 265, 365, 465. May be repeated twice.

Applied Organ 1 166, 266, 366, 466. May be repeated twice. Tri-College course.

Applied Voice 167, 267, 367, 467. May be repeated twice.

Applied Wind Instruments 168, 268, 368, 468. May be repeated twice.

Applied Percussion Instruments 169, 269, 369, 469. May be repeated twice.

Elementary Applied Voice,

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Wind Instruments, Percussion 170, 171, 172. May be repeated.

173, 273 Supplementary Applied Study

For music performance majors. 173 and 273 registrations should be for one credit; add one credit for supplementary pedagogy study. Prereq: Instructor approval.

1 each

1-2 each

174 Pronunciation for Singers I

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 Attendance0Attendance at regional performances, including NDSU events. Minimum of five registrationsnecessary for graduation for music majors, tworegistrations 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, 233 respectively.

250 Basic Conducting2Study and development of basic ensemble conducting skills.

260, 261 Piano Class III, IV1 eachIntermediate instruction in class piano. Prereq:MUSC 161.

331 Instrumental Arranging2Arranging materials for bands. Prereq: MUSC 231.

332 Choral Arranging2Arranging materials for choral ensembles. Prereq:MUSC 231.

340 Music History I3Study 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 20th century. Prereq: MUSC 340.

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 344 Wind Band Literature
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 See department for description.
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346 Survey of Vocal Literature2An overview of local literature from 1600 to present.ent. Representative works will include literature from the Western tradition.

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350 Vocal Methods and Pedagogy II

Advanced instruction in vocal pedagogy and methods for music education majors. Prereq: MUSC 150.

351 Instrumental Conducting and Literature 2

Fundamentals and techniques of conducting instrumental ensembles with practical application through the study of instrumental literature.

352 Choral Conducting and Literature

Fundamentals and techniques of conducting choral ensembles with practical application through the study of choral literature.

353 Woodwind Methods I

Class instruction in woodwind instruments for vocal and instrumental music education majors. Emphasis on pedagogical principles, applied competency of fundamentals, and literature.

354 Woodwind Methods II

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.

355 Brass Methods

Class instruction in brass instruments for vocal and instrumental music education majors. Emphasis on pedagogical principles, applied competency of fundamentals, and literature.

357 Marching Band Methods and Techniques 2 Methods and materials for directing, charting, and fielding a high school marching band.

358 Jazz Methods

History, methods, and materials for teaching jazz styles and improvisation.

359 Percussion Methods

Class instruction in percussion instruments for music education majors. Emphasis on pedagogical principles, applied competency, and literature.

364 Jazz Improvisation

Basic concepts necessary to play and teach the fundamentals of jazz improvisation.

373 Supplementary Applied Study

For music performance majors. Typical registration should be for two credits; add one credit for supplementary pedagogy study. Prereq: Instructor approval.

380 Recital

Preparation and presentation of a half recital in instrumental, keyboard, or vocal performance.

411/611 Form and Analysis

Study of the types of tonal relationships that 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.

430/630 Counterpoint

Study of contrapuntal techniques of the Renaissance and Baroque periods through analysis and composition exercises. Prereq: MUSC 231.

431/631 [330] Contemporary Harmonic Techniques

Study of harmonic and contrapuntal techniques of contemporary composers, with exercises in writing in the various styles. Prereq: MUSC 231.

473 Supplementary Applied Study3-4For music performance majors. Typical registra-
tion should be for three credits; add one credit for
supplementary pedagogy study. Prereq: Instructor
approval.

480 Recital

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Capstone for performance majors.

701 Psychology of Music

Study of acoustics, the anatomy and physiology of hearing, and how music and sound are perceived by the listener.

709 Graduate Ensemble

Ensemble registration for graduate students. Study and performance of major works of each ensemble.

721 Advanced Vocal Pedagogy and Repertoire 2 In-depth study of the physical and physiological considerations of vocal technique with application to specific voices and suitable repertoire.

722 Advanced Instrumental Music Pedagogy 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.

731 Applied Study

Private applied music study (instrumental, keyboard, vocal, conducting). Course credit determined by program and recommendation of instructor.

734 Analytical Techniques

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.

740 Medieval and Renaissance Music History 3 In-depth historical study of Medieval and Renaissance musical styles and genres through critical listening, discussions, and student and instructor presentations.

741 Baroque Music History

In-depth historical study of Baroque musical styles and genres through critical listening, discussions, and student and instructor presentations.

742 Classical Music History

In-depth historical study of Classical musical styles and genres through critical listening, discussions, and student and instructor presentations.

743 Romantic Music History

In-depth historical study of Romantic musical styles and genres through critical listening, discussions, and student and instructor presentations.

744 20th Century Music History

In-depth study of the 20th century musical language and compositional values and goals through critical listening, score analysis, discussions, and student and instructor presentations.

748 Music Bibliography and

Research Methods

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Introduction to music reference works, general music bibliography, and research methods.

760 Choral Literature 1450-1700

A study of the choral literature of the Renaissance and early Baroque periods, including major composers, genres, forms, and compositional styles.

761 Choral Literature 1700-1820

A study of the choral literature of the mid-Baroque through the Classical period including major composers, genres, forms, and compositional styles.

762 Choral Literature 1820-Present

A study of the choral literature of the Romantic period through the present including major composers, genres, forms, and compositional styles.

765 Band Literature: History and Development

Historical survey of instrumental literature for wind band, covering repertoire from the Renaissance to the present.

766 Band Literature: Chamber Music, Other Genres

Other Genres 3 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.

767 Vocal Literature I: Baroque and Classical 3 Performance and research-based study of the vocal literature of the Baroque and Classical eras, including national trends and performance practice.

768 Vocal Literature II: Romantic

Performance and research-based study of the vocal literature of the Romantic era (1800-1915), including national trends and performance practice.

769 Vocal Literature III: 20th Century

and Contemporary 3 Performance and research-based study of the vocal literature from 1915 to present, including national trends and performance practice.

780 Recital

Preparation and presentation of a professional full-length recital in instrument, keyboard, vocal, or conducting performance, with accompanying document.

789 D.M.A. Thesis

Preparation of a capstone written document for the Doctor of Musical Arts degree. At least one registration required for the Performance and Conducting tracks.

Organizations

Membership in all organizations is subject to approval of the director. May be repeated.

111 Marching Band	1
112 Varsity Band (ND:FA)	1
114 University Summer Band	1
115 University Chorus (ND:FA)	1
302 Wind Ensemble	1

303 Concert Band (ND:FA)

- 305 Women's Chorus
- 306 Concert Choir (ND:FA)
- **310 Brass Ensemble**
- 311 Jazz Ensemble
- **312 Percussion Ensemble**
- 313 Trombone Ensemble

314 Brass Chamber Ensemble

- 315 Woodwind Chamber Ensemble
- 316 String Chamber Ensemble
- **317 Madrigal Singers**
- 318 Dakota Jazz (Vocal) 319 Opera Workshop
- 320 Vocal Chamber Ensemble
- 321 Piano Chamber Music
- 322 Jazz Combo

NATURAL RESOURCES **MANAGEMENT (NRM)**

Grygiel, Chair; Ashworth, Barker, Berryhill, Biondini, Bleier, Clambey, Kirby, J. Leitch, Lin, Nuechterlein, Padmanahban, J. Richardson, Shultz, Steele, Stegman, Walter

COURSES

150 Natural Resources Management Orientation Introduction to natural resources management is-

sues, concepts, and careers.

225 Natural Resource and Agro-ecosystems 3 See Animal and Range Sciences for description.

264 Natural Resource Management Systems 3 See Agricultural Systems Management for description

453/653 Rangeland Resources Watershed	
Management	3
See Animal and Ranges Sciences for description.	

482 Environmental Economics See Economics for description.

701 Terrestrial Resources Management 3 Management and ecology of heterogeneous landscapes where ecosystem processes and human activities interact as dynamic components. Prereq: BOT 660, 754.

702 Natural Resources
Management Planning 2
Presentation of the principles, practices and key
policy issues of natural resources management
and planning. Prereq: NRM 701.

720 Natural Resources

Administration and Policy 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

Overview of the subject of environmental law.

731 NEPA and Environmental 1

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- The interaction and effects of NEPA with national environmental policy; implementation of NEPA;
- public opinion on the state of the environment.
- 1 732 Environmental Impact Statement
 - An in-depth review of EIS's including instruction and practice in the preparation of an EIS.

NURSING (NURS)

Mooney, Chair; Albaty, Bartsch, Fisher, Greenwald, C. Gross, D. Gross, Kiser-Larson, Lee, Lundeen, McCullagh, Stenson

COURSES

341 Client Concepts

Emphasizes the physiologic, psychologic, and pathophysiologic concepts which provide the foundation for professional nursing care.

342 Adult Health Nursing I

Focuses on the etiology, pathophysiologic mechanisms, and nursing care of adult clients experiencing common disorders of body system function.

343 Professional Nursing Theories and Concepts

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.

351 Nursing Concepts

Introduction to the major, encompassing concepts integral to the nursing process including communication, legal issues, values and ethics, spirituality, pain management, and immobility issues.

352 Family Nursing I

Focuses on nursing care and promotion for the childbearing family and includes identification and care of high-risk clients.

360 Health Assessment (CCN)

Focuses on health assessment and health promotion of individual clients through utilization of the nursing process and basic nursing concepts.

362 Family Nursing II

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.

2 Integrated Family Nursing

ovides the student opportunity to integrate or learning about pediatric and obstetrical care th an increased knowledge of family dynamics and cultural influences. Prereq: Licensure as practical nurse, admission to program.

401 Community Health Nursing

Synthesis and application of nursing and public health concepts to promote the wellness of communities, families, and individuals.

402 Mental Health Nursing

Synthesis and application of nursing and psychiatric-mental health concepts to promote the wellness of individuals and groups.

403 Adult Health II

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The etiology, pathophysiologic mechanisms, and nursing care of critically ill adult clients.

404 Adult Health III

The etiology, pathophysiologic mechanisms, and organization of nursing care of adult clients experiencing selected complex stressors.

405 Psychosocial Nursing

In this course the student will synthesize prior learning with further exploration of psychosocial nursing. Prereq: Licensure as practical nurse, admission to program.

411, 412 Role Development I, II 2 each

Capstone integration of nursing concepts into the complex professional practice role. Nursing program themes are applied and reinforced. Critical thinking and decision-making skills are emphasized in analysis of patients' health status.

420 Nursing Research

Introduction to the research process and its application to nursing practice.

430 Nursing Management

Study of concepts and issues related to management and leadership in professional nursing.

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. Prereq: Graduate standing.

602 Ethics of Health Care and Nursing

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. Prereq: Graduate standing.

604 Advanced Nursing Research 3 Research in nursing includes an exploration of the

research process and the methodologies appropriate to nursing. Prereq: Graduate standing.

606 Health Care Delivery Systems **Policy and Financing**

Focus on health care delivery systems configuration, policy development and how health care systems are financed. Prereq: Graduate standing.

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. Prereq: Graduate standing.

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. Prereq: Graduate standing.

612P Practicum I: Advanced

Health Assessment

Clinical opportunities for application of recently learned skills and extended clinical experiences

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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

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. Prereq: Graduate standing.

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616 Advanced Pathophysiology II

Builds on the context from NURS 614 with emphasis on normal cellular function, developmental changes and common physiological symptoms. Synergistic clinical manifestations and total bodymind responses to system alterations. Prereq: NURS 614.

618 Family Nursing Theory and Health Promotion

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. Prereq: Graduate standing.

620 Advanced Practice Roles

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

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

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. Prereq: Graduate standing.

623 The Nurse as Educator

Major study in selected area with an emphasis in research. Prereq: NURS 632.

624 Advanced Transcultural Nursing

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

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 ad-

vanced 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

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

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

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

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 612, 612P, 616.

633P Practicum II: Family Primary Care I

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

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

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

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

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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

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

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

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

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

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

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

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COURSES

201 Introduction to Peace and Conflict Studies

Interdisciplinary exploration of the roots of violence and non-violence, making use of socio-political, historical, psychological, biological, and spiritual perspectives.

PHARMACEUTICAL SCIENCES

(PSCI)

gram.

Singh, Chair; Balaz, Chatterjee, Guo, Hinderliter, Ioudina, O'Rourke, Schnell, Sharma, 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, departmental approval.

341 Pathophysiology II

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 pro-

409/609 Isotope Tracer Techniques3Theory and techniques for the use of radioactiveand stable isotopes in research.

411/611 [401] 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 [402] 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 [401] 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 [404] 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 [403] 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 [403] 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

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Poisons, their mode of action, detoxification, and treatment. Prereq: PSCI 411, 412.

470/670 Pharmaceutics III: Pharmacokinetics 3 Concepts and mathematical techniques for describing the time course of drugs in biological systems. Prereq: Departmental approval.

545 Clinical Toxicology

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

Modeling of drug disposition and receptor binding with focus on rational development of new drugs and elucidation of action mechanisms.

703 Drug Metabolism

Drug biotransformations and their effects on drug properties such as duration of action, potency, toxicity, and specificity. Prereq: BIOC 701, 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

Study of action mechanisms of drugs affecting the central and peripheral nervous systems.

747 Cardiovascular Pharmacology

Study of action mechanisms of drugs affecting the circulatory systems, including their pathology.

762 Advanced Biopharmaceutics2Stability and kinetic factors involved in absorption, distribution, metabolism, and excretion of drug products. Prereq: PSCI 470.

PHARMACY PRACTICE (PHRM)

Miller, Chair; Biberdorf, Brown, Christensen, R. Clarens, Drummond, Harrington, Kearney, Kelsch, Naughton, Omvig, Patterson, Schmitz, Scott, Strandberg, Sylvester, Welch, Wilhelm

COURSES

170 Common Medicines and Diseases2Consumer-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

Principles of pharmacology and therapeutics for nursing and other non-pharmacy health professions. Does not count toward a pharmacy major.

351 Pharmaceutical Care I

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.

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352 Pharmaceutical Care II

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

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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

The third course in a six-semester sequence, this course focuses on prescription dispensing 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 and dispensing activities are incorporated into the Concept Pharmacy Lab. Prereq: PHRM 451.

471 Clinical Pharmacokinetics

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

This course introduces students to management techniques applicable to the contemporary practice of pharmacy in community and institutional settings. Prereq: Admission to professional program.

480 Drug Literature Evaluation 3

Survey of clinical drug literature sources and evaluation of the original literature. Prereq: Admission to professional program.

520 PTDI: Pediatrics-Geriatrics

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.

532 PTDI: Infectious Disease

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: Bachelor of Science in Pharmaceutical Sciences.

534 PTDI: Rheumatology, Endocrine, and Reproduction

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: Bachelor of Science in Pharmaceutical Sciences.

535 PTDI: Neoplastic Diseases

In-depth study of the pathophysiology, pharmacotherapy, diagnostic evaluation, and therapeutic approach to major neoplastic disorders. Prereq: Bachelor of Science in Pharmaceutical Sciences.

536 PTDI: Neurology and Psychiatry Pathophysiology and pharmacotherapy of the major neurologic and psychiatric disorders. Prereq: Bachelor of Science in Pharmaceutical Sciences.

537 PTDI: Renal Disease/Fluid & Electrolytes 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: Bachelor of Science in Pharmaceutical Sciences.

538 PTDI: Cardiovascular and Pulmonary Diseases

Pharmacotherapy of cardiovascular and pulmonary diseases. Study of the pathophysiology, clinical presentation, and treatment of various cardiovascular and pulmonary diseases. Prereq: Bachelor of Science in Pharmaceutical Sciences.

558 PTDI: Gastrointestinal and Nutrition

Learn to provide pharmaceutical care for people with gastrointestinal disease and/or requiring specialized nutritional support. Prereq: Bachelor of Science in Pharmaceutical Sciences.

572 [472] Pharmacy Law 2 Pharmaceutical jurisprudence, including state and federal laws and regulations concerned with the practice of pharmacy.

575 Pharmacy Management

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. Prereq: Departmental approval.

578 Non-Prescription Medications

Introduction to over-the-counter medications including indications, contraindications, dosage forms, interactions, side effects, warnings, and precautions. Prereq: Departmental approval.

579 Prescription Practice

Dispensing of prescription and non-prescription medication via a computerized model-pharmacy and the pharmacist's professional, ethical, and legal responsibility. Prereq: Bachelor of Science in Pharmaceutical Sciences.

581, 582, 583 Clinical

Clerkship I, II, III 6-18 each Experiential clinical training for pharmacy practice. Prereq: Successful completion of third professional year.

PHILOSOPHY (PHIL)

Cater (Emeritus), Cooley

COURSES

101 Introduction to Philosophy (CCN) 3 Basic problems, concepts, and methods of philosophy. (ND:HUM)

210 [RELS 260] Ethics (CCN)

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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.

215 Contemporary Moral Issues (CCN)

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.

216 Business Ethics 3 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.

257 Traditional Logic

See Humanities for description.

321 Greco-Roman Philosophy Greco-Roman philosophy from pre-Socratics to the Stoics and Epicureans.

322 Medieval Philosophy 3 Western philosophy from St.Augustine to Ockham and Marsilius of Padua.

323 Modern Philosophy Western philosophy from Descartes to Kant.

356 Greek Philosophy See Humanities for description.

357 Augustine

Study of Augustine's thought, especially philosophical, in its historical context.

359 Thomas Aquinas See Humanities for description.

366 Metaphysics See Humanities for description.

476 Kant and Hegel See Humanities for description.

477 20th Century Philosophy See Humanities for description.

481/681 Philosophy of Science Philosophical aspects of science.

486 Philosophy and Literature See Humanities for description.

487 Aesthetics

See Humanities for description.

PHYSICS (PHYS)

Kroll, Chair; Denton, Kelly, Rottman, Sawicki, Swenson

COURSES

110, 110L Introductory Astronomy, Lab (CCN)

Qualitative survey of the current understanding of the universe including planetary explorations, solar phenomena, stars, black holes, nebulas, galaxies. (ND:SCI)

120, 120L Fundamentals of Physics, Lab (CCN)

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3.1 Application of physics concepts and principles to the real world. Topics selected from mechanics, heat, optics, electricity, and magnetism. (ND: LABSC)

180 Contemporary Concepts in Physics 1 An introduction to concepts of modern physics including relativity and quantum mechanics with applications to atomic and nuclear systems.

211, 211L College Physics I, Lab (CCN) 3,1 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)

212, 212L College Physics II, Lab (CCN) 3.1 Second course for students without a calculus background. Includes optics, electricity, magnetism, and thermodynamics. Prereq: PHYS 211, 211L. (ND:LABSC)

215 Research for Undergraduates 1-3 Special research studies in physics under the supervision of an instructor.

251, 251L University Physics I, Lab (CCN) 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.

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.

350 Modern Physics

- Breakdown of classical physics, special relativity, 3 Bohr model, Schrodinger mechanics of simple systems, atomic structure, selected topics from 3 nuclear and solid state physics. Prereq: PHYS 252, MATH 266.
- 3 351, 352 Mechanics I, II 3 each Rigid bodies and systems of particles analyzed with Lagrangians, Hamiltonians, and methods from
- 3 vector calculus; gravitation; central field problems; wave motion; fluid dynamics. Prereq for 351: PHYS 252, MATH 266. Prereq for 352: PHYS 351.
 - **361 Electromagnetic Theory**
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- Electrostatics, magnetostatics, dielectrics, electric circuits, time varying electric and magnetic fields, 3 electromagnetic induction, physical content, and application of Maxwell's equations. Prereq: PHYS 252, MATH 266. 3

363 Optics

Introductory modern optics at an intermediate level. Geometrical optics and matrix methods applicable to computer ray-tracing techniques. Light as electromagnetic waves: interference, coherence, and diffraction. Characteristics of laser beams. Prereq: PHYS 252.

401 Engineering Physics I: Fundamental Properties of Solids

Schrodinger's equation and quantum mechanics of simple systems. Properties of solids

including band theory of metals and semiconductors,Fermi-Diracstatistics,properties of p-njunction, light emitting diodes and laser diodes. Prereq: PHYS 252.

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. Crosslisted with ECE.

411L/611L Optics for Scientists and Engineers Laboratory

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.

415/615 [402/602] Elements of Photonics

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 Thermodynamics3Classical principles and laws of thermodynamics.Cyclic processes and entropy functions. Legendredifferential transformations.Clausius equations,and principles of Maxwell's equations.PHYS 252.

463/663 Statistical Mechanics2The Maxwell-Boltzmann distribution functionand its applications to thermodynamic problems.Introduction to Bose-Einstein and Fermi-Dirac sta-tistics. Prereq: PHYS 462.

471 Advanced Laboratory 2 Advanced laboratory in modern physics: experiments such as electron diffraction, nuclear spectroscopy, 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 252, 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 783: 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

Review of thermodynamics and statistical mechanics; Monte Carlo and molecular dynamics simulation; applications to phase transitions. Prereq: PHYS 463.

761 Electromagnetism

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, 782 Solid State Physics I, II 3 each Crystal structure and binding, reciprocal lattices and x-ray diffraction, lattice vibrations, thermal properties, free electron model, band theory, magnetism, superconductivity. Prereq: PHYS 486, 781 respectively.

PLANT PATHOLOGY (PPTH)

Rasmussen, Interim Chair; Biller, delRio, Freeman, Gudmestad, Neate, Nelson, Rasmussen, Secor, Stack, Statler

COURSES

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324 Introductory Plant Pathology3Etiology, symptomatology and control of representative plant diseases and demonstrations. 2lectures, 1 laboratory. F

453/653 Microscopy

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, symptomology, control, and importance of field and forage crop diseases. 2 lectures, 1 laboratory. Prereq: PPTH 324. S (even years)

455/655 Plant Disease Management

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

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

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

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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

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

Identification, epidemiology, symptomology, control, and techniques for studying plant diseases caused by bacteria. 3 lectures, 1 laboratory. Prereq: PPTH 324. F (odd years)

754 Plant Disease Epidemiology 3

Temporal and spatial dynamics of diseases and causative pathogens in plant populations. 2 lectures, 1 laboratory. Prereq: PPTH 324. F (even years)

756 Techniques in Electron Microscopy

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. Prereq: Departmental approval. F (odd years)

759 Host-Parasite Genetics

Host-parasite genetics including genetics of plant and pathogens and gene-for-gene relationships. 3 lectures. Prereq: PLSC 311. S (even years)

760 Advanced Mycology

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)

761 Advanced Plant Pathology

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)

PLANT SCIENCES (PLSC)

Schneiter, Chair; Berglund, Berzonsky, Cai, Carena, Chakraborty, Christoffers, Dai, Deckard, Dexter, Elias, Franckowiak, Grafton, Hammond, Hatterman-Valenti, Helms, Herman, Horsley, Howatt, Johnson, Kegode, Kianian, Laschkewitsch, Lee, Li, Lym, Manthey, McClean, McMullen, Mergoum, Messersmith, Meyer, Ransom, Schwarz, Smith, Thompson, Williams, Zeleznik, Zollinger

COURSES

110 World Food Crops (CCN)3Scientific principles of crop growth, worldwide
production, management alternatives, and process-
ing for domestic and international consumption.2 lectures, 1 discussion, 1 tutorial laboratory. F, S
(ND:SCI)

111 Genetics and You (CCN)

Basic concepts in genetics with emphasis on current human genetics. 2 lectures. S

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177 Floral Design (CCN)

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

210 Horticulture Science (CCN)

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

211 Horticulture Science Laboratory

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

215 Weed Identification

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

219 Introduction to Prairie and Community Forestry (CCN)

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)

225 Principles of Crop Production (CCN) 3 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

315, 315L Genetics, Lab 3.1 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, E S

320 Principles of Forage Production (CCN) 3 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 or departmental approval. F

323 Principles of Weed Science (CCN) 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. S

335 Seed Technology and Production

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.

340 Grain Grading

Description and interpretation of the Grain Standards Act and instruction in grading of grain. 3 lectures, 3 two-hour laboratories. Prereq: PLSC 225 or departmental approval. S/2

341 Landscape Bidding and Contracting

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)

350 Sugarbeet Production

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History, growth, and development; soil and fertility management; weeds, insect, and disease control; cultivars; harvesting, storage, and processing of sugarbeets. Prereq: PLSC 110, 210, or departmental approval. F

355 Woody Landscape Plants

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, or departmental approval. F

360 Horticultural Food Crops

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, or departmental approval. S (odd years)

362 Potato Science

History, botany, cultural practices, harvesting, breeding, physiology, storage, and processing of the potato. 2 lectures. Coreq: BIOL 150 or 151, PLSC 210, or departmental approval. F (odd years)

365 Herbaceous Landscape Plants (CCN)

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, or departmental approval. F (odd years)

368 Plant Propagation (CCN)

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, or departmental approval. S

375 [348] Turfgrass Management

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, or departmental approval. F (even vears)

381 Sports Turf Operations

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

411/611 Genomics

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An integrated presentation of genome organization, genome sequencing and characterization, comparative genomics, transcriptomics, proteomics, and metabolomics. Prereq: BIOL 150, STAT 330. F

412 [382] Nursery Production and Management

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Industry overview, production-management practices, facilities, equipment, nursery stock standards, storage, and over wintering. Field trips. 3 lectures. Coreq: PLSC 368. S (odd years)

422 [372] Greenhouse Production and Management

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)

431/631 Intermediate Genetics

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

446/646 [346 & 726] Genetics and Plant Improvement

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

453/653 Advanced Weed Science

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:

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An Integrated Approach 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 manage-

ment 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 375, 381.S

465/665 Advanced Landscape Plants

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

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 or instructor approval. Crosslisted with ASM. F

469 Golf Course Irrigation II

Irrigation system installation, winterization, startup, troubleshooting, renovation, and drainage. 1 lecture. Prereq: PLSC 468 or instructor approval. Cross-listed with ASM. S

484/684 Plant Tissue Culture and Micropropagation

Principles, techniques, and applications of plant tissue, organ, cell, protoplast, and embryo culture. Emphasis on micropropagation. 1 lecture, 1 twohour laboratory. Prereq: PLSC 315. F

485/685 [473/673] Arboriculture Science

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

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. F (even years)

710 Professional Development I (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. 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

Hybridization of North Dakota crops. Laboratory by arrangement. Prereq: PLSC 446/646, 724. SS (odd years)

731 Plant Molecular Genetics

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

Application of incomplete block designs, confounding and covariance analyses to biological problems. 2 lectures. Prereq: PLSC 724. S (odd years)

741 Cytogenetics

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 vears)

751 Advanced Genetics

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Classical and modern genetic concepts, nature and induction of mutations linkage, and application of chi-square. 3 lectures. Prereq: PLSC 315, 431/631. S (odd years)

753 Action and Fate of Herbicides

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 [750 & 755] Advanced Crop Management **Decision Making**

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

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

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

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

Applied quantitative genetics and implications on plant breeding. 2 lectures. Prereq: PLSC 315, 724, 780, or instructor approval. Recommended: 446/646. S (even years)

POLITICAL SCIENCE (POLS)

Thompson, Chair; Ambrosio, Amlund, Gupte, Monzingo,Wood

COURSES

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110 Introduction to Political Science (CCN) 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)

Principles of American government, political behavior, and institutions. (ND:SS)

120 Terrorism (CCN)

Examination of problems of terrorism. Includes its historical perspectives; terrorist motivations, organizations, tactics, strategies; role of media; government responses; future trends, prospects.

210 Current Politics (CCN)

Study of current national and state political issues.

215 Problems and Policies in American

Government (CCN) Study of the functioning of American government focusing on the policy process. (ND:SS)

216 Campaigns and Elections

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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)

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)

Study of ideas, belief systems, and basic principles of ideologies.

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

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

Study of women leaders; their roles and perspectives within a national and international framework.

360 Principles of Public Administration 3 Empirical study of public administrators in their diverse roles and functions.

420/620 Political Behavior - Executive-Legislative Process

Behavioral study of executives and legislators with emphasis on examination of empirical data.

421/621 Political Behavior — Political Parties 3 Behavioral study of political leaders with emphasis on examination of empirical data.

422/622 State and Local Politics

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 or Senior standing.

430/630 Constitutional Law — Civil Liberties 3 Examination of First Amendment rights including freedom of speech, press, religion, association, and assembly. Due process and equal protection concerns are also addressed.

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431/631 Constitutional Law — Criminal Justice

Study of Fourth, Fifth, and Sixth Amendment rights. Emphasis on the law of arrest, search and seizure, self-incrimination, and right to counsel.

442/642 Global Policy Issues

Analysis of the impact of planetary limits to growth, increasing globalization of the world economy, and changing control over resource systems on global politics.

444/644 International Law

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.

445/645 Ethnic Conflicts

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.

450/650 Politics of the Developing Countries 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.

451/651 Politics of the

Industrialized Countries

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.

452/652 Comparative Political Economy

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.

489 Senior Seminar

Capstone experience. Emphasis on integrative skills needed to interrelate the concepts of the discipline.

720 Theoretical Perspectives to the Study of Political Science

Designed to guide beginning graduate students through the dominant paradigms and emerging subject areas of political science scholarship.

PSYCHOLOGY (PSYC)

Wittrock, Chair; Council, Hinsz, Friesen, Gordon, Langley, McCaul, McCourt, Miltenberger, Nawrot, O'Neill, Robinson, Rokke, Troop-Gordon

COURSES

111 Introduction to Psychology (CCN) 3 Survey of the scientific study of behavior and mental processes. (ND:SS)

210 Human Sexuality

Survey of biological, developmental, and psychological aspects of human sexuality. Prereq: PSYC 111. Cross-listed with HNES.

211 Introduction to Behavior Modification 3 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.

212 Psychological Aspects of Drug Use and Abuse

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.

214 Social Interaction

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See Sociology for description. (ND:SS)

221 Psychology in Business and Industry

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)

250 Developmental Psychology (CCN)

Survey of the psychology of human life span development. Coverage also includes heredity and prenatal development. Prereq: PSYC 111. (ND:SS)

260 Introduction to Neuroscience

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.

270 Abnormal Psychology (CCN)

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)

322 Thinking and Making Decisions

Covers the functional uses of critical thinking. Focuses on uses in problem solving and decisionmaking.Applications are directed at both personal and professional concerns. Prereq: PSYC 111.

350 Research Methods I

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.

351 Research Methods II

Experimental and quasi-experimental designs in psychological research. Laboratory includes performance of experiments, data analysis, and preparation of research reports. Prereq: PSYC 350.

360 Animal Behavior

See Biological Sciences (Zoology) for description.

370 Forensic Psychology

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.

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465/665 Psychobiology

Fundamental anatomy (structure) and physiology (function) of the nervous system. Physiological bases of behavior. 2 lectures, equivalent of 2-hour laboratory. Prereq: PSYC 351.

468/668 Personality

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.

470/670 Experimental Social Psychology 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.

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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.

440/640 Experimental Methods

380 Clinical Psychology

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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.

453/653 Organizational Psychology

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.

460/660 Sensation and Perception

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.

461/661 Memory and Knowledge

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.

463/663 Experimental Development Psychology

Development Psychology 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.

464/664 Attention and Thinking

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.

471/671 The Psychology of Aging

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.

472/672 Advanced Psychopathology

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.

473/673 Child Psychopathology and Therapy 3 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.

474/674 Behavior Analysis

in Developmental Disabilities

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.

480/680 History and Systems

Historical development of scientific psychology. Emphasis on the development of various systems of psychology in America. Capstone experience. Prereq: PSYC 351 or Senior standing.

481/681 Health Psychology

Application of behavioral procedures to the prevention, treatment, and rehabilitation of medical disorders. Emphasis on contemporary research findings. Prereq: PSYC 350.

486/686 Neuropsychology

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.

489 Honor Thesis	
Capstone experience option.	

718 Visual and Cognitive Neuroscience 3 Fundamentals of current visual and cognitive neuroscience research including detailed survey of ideas, methods, and models used to understand function of the human nervous system.

727 Advanced Topics in Visual Perception 3 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 or equivalent.

731 Fundamental Processes in Cognition 3 Explores the underlying architecture of the human cognitive system-how it takes in, processes, stores, and retrieves information.

732 Applied Cognitive Processes 3 Explores the ways cognitive principles operate in ecologically valid (real-world) situations.

733 Judgment and Decision Making

Explores issues and topics related to judgment and decision-making.

735 Neural Networks

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See Computer Science for description.

750 Introduction to Clinical Issues and Practices

Instruction and practice in clinical interview techniques and discussion of clinical issues including ethics, laws, and crisis intervention.

755 Behavior Therapy and Assessment I

Introduction to the nature and characteristics of behavioral assessment and behavior therapy. Laboratory includes behavioral interviewing and training in assessment and treatment procedures.

756 Behavior Therapy and Assessment II

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.

761 Applied Research Methods

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.

762 Advanced Research Methods and Analysis 3

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.

770 Advanced Psychological Assessment

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 projectile methods.

771 Social/Health Psychology Research 3 Covers research designs frequently utilized in conducting social psychology related research with particular emphasis on health psychology.

782 Emotions 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. Prereq: Departmental approval.

787 Advanced Social Psychology and Health 3 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, selfprotective health behavior, and disease prevention. Prereq: PSYC 670 and 681 or departmental approval.

RADIOLOGIC SCIENCES (RS)

P. Olson

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COURSE

111 Introduction to Radiologic Sciences Lectures, discussions, and field trips focus on professional traits, ethical behavior of the health care provider, major curriculum requirements, and scope of practice.

RELIGIOUS STUDIES (RELS)

Helgeland

COURSES

100 Introduction to Religion (CCN) 3 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)

210 [260] Ethics

See Philosophy for description.

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220 Old Testament (CCN) 2 Study of the religious, political, and social history of ancient Israel as reflected in the Hebrew Bible.

230 New Testament (CCN) 3 Overview of the developments in the primitive Christian community as reflected in the New Testament.

243 Religion and Self (CCN) 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.

270 American Religious History (CCN) 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.

315 Contemporary Religion

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.

320 History of Christianity

Major developments in the Christian religion including scriptures, persecution, monasticism, papacy, Reformation, science and religion, and the ecumenical movement. Cross-listed with HIST.

401 Sociology of Religion 3

See Sociology for description.

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453 Magic and Religion See Anthropology for description.

RESPIRATORY CARE (RC)

P. Olson

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COURSE

111 Introduction to Respiratory Care 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)

Slobin, Chair; Corwin, Goreham, Klenow, Lindgren, Rathge, Youngs

COURSES

110 Introduction to Sociology (CCN)

Introductory analysis of the nature of society, the interrelationship of its component groups, and the process whereby society persists and changes. (ND:SS)

115 Social Problems (CCN)

Sociological analysis of major social problems.

202 Minorities and Race Relations

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.

214 Social Interaction

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)

233 Social Organization

Examination of major institutional characteristics of modern societies. Emphasis on social issues as they relate to the organization of societies.

340 Social Research Methods3Overview of the scientific method, the philosophyof science, and the goals of science. Detailed studyof qualitative and quantitative methodologies.Cross-listed with COMM.

341 Social Research Methods Laboratory1Laboratory to accompany SOC 340. Provides application of conceptualization, operationalization,

sampling methods, qualitative and quantitative research methods, and computer statistical analysis. Cross-listed with COMM.

350 Social Work I

Orientation to social work and the study of common human needs.

351 Social Work II

Advanced discussion of social work and human service administration. Prereq: SOC 350.

401/601 Sociology of Religion

Study of religion viewed as a social institution with a characteristic history, ecology, structure, behavior, and purpose. Cross-listed with RELS.

403/603 Sociology of the Great Plains

Social and cultural patterns, trends, and problems peculiar to life in the semi-arid Great Plains.

405/605 Community Development

Study of communities viewed as social systems. Includes political, economic, social, and economic factors affecting community growth and decline. Community development methods are addressed.

407/607 Deviant Behavior

See Criminal Justice for description.

410/610 Social Inequality

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Analysis of social and economic inequities and investigation of the relationship between inequity and life chances.

412/612 Sociology of Sex Roles

The socialization of men and women; an analysis of institutional norms, values, and attitudes and their effects on gender role development. Prereq: SOC 110.

413/613 Sociology of Work3Analysis of contemporary work-related issues concerning changing organizational structures andcultural expectations. Prereq: SOC 110.

416 Sociology Through Literature3Study of basic concepts of sociology as illustratedin selected literature from 19th and 20th centuryEnglish, American, French, and Russian novels.Prereq: SOC 110.

417/617 Sociology of the Family

Comparative family types, member relationships, family dynamics in relation to personality, social change, and social values.

418/618 Social Psychology

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.

420/620 Sociology of Disaster

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.

422/622 Development of Social Theory Socialogical theories and systems from Con

Sociological theories and systems from Comte, Marx, Durkheim, and Weber through the 20th century. Prereq: SOC 110.

424/624 Feminist Theory and Discourse

Historical overview of feminist ideas and major writings from the 18th century to the present, which includes issues related to women's personal, social, and public lives.

426/626 Sociology of Medicine

Analysis of the social aspects of health and illness, the health care professions, organization of health care, and related issues.

427/627 Sociology of Mental Health

Social factors affecting the nature and incidence of mental disorders, the meaning of social disorders as social phenomena, methodological problems, and the social context of psychiatry. Prereq: SOC 110.

431/631 Environmental Sociology

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.

439/639 Social Change

Analysis of the complex nature of social change in communities, the nation, and internationally. Prereq: SOC 110.

440/640 Sociology of Aging

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Examination of sociological perspectives on aging. Topics include social theories of aging, retirement, long-term care, chronic illness, and death.

441/641 Sociology of Death

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.

442/642 Current Issues in Medicine

Overview of current sociology of medicine issues such as chronic illness, bioethics, medical technology, changes in health care organizations, and women's health issues.

443/643 International Disasters

Impacts of natural and human-made disasters on industrialized and developing societies; relief and reconstruction post-disaster programs.

445/645 Special Populations in Disasters3Identification of special populations and theirneeds that arise in emergency or disaster situationsboth in industrialized and developing countries.

465/665 Applied Demographics

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.

489 Senior Capstone in Sociology

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.

700 Qualitative Methods

Advanced analysis of the methods used in qualitative research projects such as intensive interviewing, focus groups, and participant observation. Prereq: SOC 340.

701 Quantitative Methods

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.

723 Social Theory

Examination of contemporary social theories and theory construction. Prereq: SOC 422/622.

764 Parole and Probation

Develops a substantive understanding of the conceptual, resource, and managerial issues in probation and parole.

SOIL SCIENCE (SOIL)

Richardson, Chair; Casey, Cihacek, Enz, Franzen, Giles, Goos, Hopkins, Khan, Moraghan, Prunty

COURSES

210 Introduction to Soil Science (CCN) 3 Examination of basic soil properties that influence land use, conservation, and plant growth. 2 lectures, 1 three-hour laboratory, including 3 field trips on soil development and variability. F,S (ND: LABSC)

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217 Introduction to Meteorology and Climatology

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)

Principles and practices of soil management and conservation planning in relation to government programs, the environment, erosion, tillage systems, crop production, and sustainability of soil, water, and air 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. 2 lectures, 1 two-hour laboratory. Prereq: SOIL 210, CHEM 121, 121L.S

333 Managing Soil Physical Properties

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

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 genesis, morphology, geography, techniques of soil survey; field studies and description of soils. 3 lectures, 1 three-hour laboratory. One or more Saturday 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

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 332, CHEM 122, 122L. F

465/665 Soil and Plant Analysis

Laboratory analysis of soil, plant, and environmental materials for constituent elements. 2 lectures, 1 laboratory. Prereq: SOIL 210, CHEM 330, 331. S (odd years)

480/680 Soil and Waste Disposal

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, Graduate standing, or departmental approval. S (even years)

733 Environmental Modeling

Mathematical simulation and computer model development for analysis of current environmental problems. Emphasis on mechanics of model construction, calibration, and validation. 2 lectures. Prereq: Computer programming. F (odd years)

763 Soil Physics

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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 333, 339, PHYS 211, MATH 146 or 165.8 (even years)

782 Advanced Soil Fertility

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)

783 Advanced Soil Physics

Mathematics of saturated and unsaturated soil water flow, including use of computer models. 3 lectures. Prereq: SOIL 763, MATH 147 or 166. S (odd 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. Prereq: SOIL 444/644. F (even vears)

785 Advanced Soil Chemistry

Advanced study of chemical properties of soil. 2 lectures. Prereq: SOIL 455/655. S (even years)

SPANISH (SPAN)

Hawley, Pearson, Soria-Dufner, Sparks

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

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Spanish I, II (CCN) Emphasis on developing proficiency in the four

language skills. Review of grammar, practice in composition, and cultural and literary readings. Prereq: SPAN 102 or equivalent. 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 or equivalent.

315 Introduction to Spanish/

Latin American Civilization Introduction to the political, social, and cultural history of Spanish-speaking lands. Includes important schools of art, music, and architecture. Taught in Spanish. Prereq: SPAN 312.

401 Advanced Spanish Grammar and Writing

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Writing practice with primary focus on form, syntax, and style. Taught in Spanish. Prereq: SPAN 312.

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410 Introduction to Spanish Literature

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.

411 Introduction to Spanish American Literature

Representative works from the pre-conquest era to the 20th century. Overview of literary movements, genres, and cultural background. Taught in Spanish. Prereq: SPAN 312.

412 Contemporary Spanish American Literature

Developments and techniques in major 20th century texts through representative works. Overview of cultural, historical, and socio-political aspects, as well as literary background. Taught in Spanish. Prereq: SPAN 312.

489 Senior Thesis

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, Huang, Rao (Emeritus), Terpstra, Zhang

COURSES

330 Introductory Statistics 3 Frequency tables, histograms, probability, wellknown probability distributions, one and two sample tests of hypotheses, confidence intervals, and contingency tables. Prereq: MATH 103 or 104. (ND:MATH)

331 Regression Analysis

Simple and multiple regression techniques and correlation coefficients. Extensive use of SAS. Emphasis on applications. Prereq: STAT 330.

367 Probability

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

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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

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.

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451/651 Bayesian Statistical Decision Theory

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

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

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.

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

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

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 367.

465/665 Meta-Analysis Methods

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

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 or 462/662.

476 Actuary Exam Study II

Selected material from probability and mathematical statistics in preparation for the national actuarial exam. Prereq: STAT 368 or 468.

520 Statistical Methods for Pharmacy

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.

725 Applied Statistics

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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

Direct assays, parallel line assays, slope ratio assays, multiple assays, and quantal assays. Model, estimation, and testing. Probit and logit analysis. Prereq: STAT 461, 520, or 725.

732 [735] Introduction to Bioinformatics See Mathematics for description.

750 Time Series

Estimation of trend in time series data. Seasonal models. Stationary models. Moving average, autoregressive, and ARMA models. Model identification. Forecasting. Intervention analysis. Prereq: STAT 367 or 467, 461/661.

761 Advanced Regression

Multiple regression, analysis of residuals, model building, regression diagnostics, multicollinearity, robust regression, and nonlinear regression. Prereq: STAT 367 or 467, 461/661.

762 Messy Data Analysis

One-way classification models with heterogeneous errors.Two-way classification analysis in the unbalanced case. Analysis of mixed models. Splitplot, nested, and crossover designs. Prereq: STAT 462/662.

764 Multivariate Methods

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 or 462.

767 Probability and Mathematical Statistics I 3 Random variables, discrete probability distributions, density functions, joint and marginal density

tions, 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 II3Properties of estimators, confidence intervals,
hypotheses testing, Neyman-Pearson lemma, likeli-
hood ratio tests, complete and sufficient statistics.
Additional projects required. Prereq: STAT 767.

770 Survival Analysis

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

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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.

775 Linear Models II

Repeated measurements models. Variance components models. Response surfaces. Growth curve models, unbalanced designs. Prereq: STAT 774.

777 Multivariate Theory

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

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 768 or MATH 750. Crosslisted with MATH.

780 Asymptotics, Bootstrap,

and Other Resampling Plans

Development of large sample and small sample properties of a variety of estimators. Prereq: STAT 768.

786 Advanced Inference

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

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)

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 [281] Dramatic Literature and Style

Survey of dramatic literature from the 18th 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

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)1Participation in various activities of theatrical production. May be repeated.

261 Acting II (CCN) 3 Practical application of fundamental skills to textual work. Prereq:THEA 161.

266 [362] Voice and Movement for the Actor 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 or instructor approval.

270 Stagecraft (CCN) 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.

271 Costume Construction3Introduction to costuming. Construction, alteration, and acquisition of costumes and costumeaccessories. 3 lectures, 1 two-hour laboratory.

275 Makeup Design I 3 Fundamentals of stage makeup. Facial analysis and introduction to materials and techniques. Elementary character interpretation through twodimensional application.

276 Makeup Design II 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.

280 World Theatre3Survey of the theatre and drama of variousEuropean and non-Western cultures. (ND:HUM)

350 Studio Theatre 1-2 Workshops in specialized techniques or a showcase for individual creativity. Includes projects in acting, directing, design, movement, and play writ-

 361 Movement for the Actor
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 Introduction to basic stage movement techniques.

Emphasis on bodily awareness and control, responsiveness, freedom from personal mannerism, and physical characterization. Prereq: THEA 261. (alternate years)

365 Directing I

Introduction to the creative process of directing. Focus on script analysis, basic directing tools, and scene work. Prereq:THEA 261.

370 Technical Theatre Production3Advanced study in technical theatre production.Emphasis on planning processes and individualduties/responsibilities for technicians at all levels

of theatrical production. 2 lectures, 1 three-hour laboratory. Prereq: THEA 270, 271.

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371 Technical Drawing

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Introduction to hand drafting and computer-assisted drafting techniques. Emphasis on acquisition of skills to produce technical drawings for theatrical scenic and lighting design.

372 Stage Management

Fundamentals of production stage management. Emphasis on the role, duties, and relationships of the stage manager as a member of the production team.

375 Introduction to Stage Design See department for description.

377 Lighting for the Stage

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.

378 Sound Design

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.

440 Advanced Projects in Production

Advanced projects in acting, directing, and technical theatre. May be repeated. Prereq: THEA 370 or departmental approval.

450 Capstone Experience

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.

461 Acting Styles: Verse Drama

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 161, 261, 266. Recommended: THEA 466, 480. F (even years).

462 Acting Styles: Modern and Contemporary Non-Realism

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 nonrealistic styles. Prereq: THEA 261.

465/665 Directing II

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Problems in directing, formulating production concepts, casting, working with actors, and aiding characterization. Includes preliminary work with thrust and arena staging. Prereq:THEA 365.

466 Advanced Voice for the Actor

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.

467 Advanced Movement for the Actor

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.

468 [363] The Business of Acting

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.

475/675 Design for the Stage I

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.

476/676 Design for the Stage II

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.

480/680 History and Literature

of the Theatre I

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Historical study of theatre architecture, staging methods, individual artists, and plays from the theatre's origins through the 17th century. Prereq: THEA 180. (alternate years)

481/681 History and Literature

of the Theatre II 3 Historical study of theatre architecture, staging methods, individual artists and plays from the 18th century to the present. Prereq:THEA 480/680. (alternate years)

TRANSPORTATION AND LOGISTICS (TL)

Lambert, Tolliver, Traub, Wells, Yazdani

COURSES

774 [AGEC 774] Transportation Corridor Planning

Design of intercity corridor studies. Corridor transportation planning procedures. Rail freight, transit, and highway corridor capacity models. Corridor levels of services and performance. Economic evaluation of capacity enhancements. Prereq: CE 418/618 or TL 782 with instructor approval.

782 Transportation Systems I

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 or equivalent.

783 Transportation Systems II

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.

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784 Intermodal Freight Transportation

Intermodal freight transportation modes. Container handling and logistics. Rail, highway, and ocean vessel equipment. Terminals and cargohandling procedures. Landside and port issues. Documentation and liability. Intermodal information systems. Policy, regulatory, and financial issues. Prereq: MATH 265 or equivalent.

785 Spatial Analysis of Transportation Systems

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

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. Prereq:TL 782.

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 INTERDISCIPLINARY STUDIES (UNIV) COURSES

189 Skills for Academic Success

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. Cross-listed with ABEN, AGRI, HD&E, and ME.

402 Power of Narrative

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

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

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

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

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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. Completion of the course includes a brief oral presentation. Pass/ Fail grading only.

VETERINARY SCIENCE (VETS)

Odde, Chair; Berryhill, Colville

COURSES

115 Medical Terminology for the

Paraprofessional

Medical terminology explored through a systematic study of word parts and the combinations used to build medical terms.

125 Animal Restraint

Study of behavioral characteristics and handling techniques of farm, companion, and laboratory animals.

130 Companion Animal Breeds

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

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 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 Radiography3Diagnostic radiograph production including X-raymachine operation, dark room procedures, radiographic positioning, and radiation safety.

256 Veterinary Clinical

Techniques and Instruments4Clinical procedures and instrumentation used in
the day-to-day operation of a veterinary practice.

259 Small Animal Diseases

Basic principles of common dog and cat diseases with emphasis on client education.

357 Veterinary Pharmacology

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 and Procedures

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

Study of urine analysis and serum chemistry principles and procedures commonly utilized in veterinary medicine.

387 Veterinary Clinical Pathology III

Study of parasitology principles and procedures commonly utilized in veterinary medicine.

481 Ward Care/Clinic Care

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Supervised experience managing the care and feeding of Veterinary Technology Program animals and clinical veterinary facilities. May be repeated 4 times.

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. Prereq: 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 Studies3Exploration 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.

350 (UNIV) 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. Prereq:WS 110.

489 Internship/Capstone

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. Prereq: Instructor approval.

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.

Dr. Richard Kunkel	term expires
Devils Lake, N.D.	June 30, 2006
Bruce I. Christianson	term expires
Minot, N.D.	June 30, 2007
Susan Andrews	term expires
Mapleton, N.D.	June 30, 2006
Beverly Clayburgh	term expires
Grand Forks, N.D.	June 30, 2007
Ralph D. Kingsbury	term expires
Grafton, N.D.	June 30, 2005
Pamela J. Kostelecky	term expires
Dickinson, N.D.	June 30, 2005
John Q. Paulsen	term expires
Fargo, N.D.	June 30, 2008
Ann Burnett	term expires
NDSU	June 30, 2005
Kayla Effertz	term expires
Universitv of North Dakota	June 30, 2005

Chancellor of the North Dakota University System Robert L. Potts, Bismarck, ND

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Patricia Berglund, Ph.D., Director, Northern Crops Institute

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- Gene C. Griffin, M.S., Director, Upper Great Plains Transportation Institute
- Neil D. Howe, M.S., Director, North Dakota Division of Independent Study
- James C. Miller, M.S., Executive Director, NDSU Alumni Association and Development Foundation

Kathleen Tweeten, MBA, Director, Center for Community Vitality and Institute for Business and Industry Development

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and Assessment Otto J. Helweg, Ph.D., Dean of the College

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Jay A. Leitch, Ph.D., Dean of the College of Business Administration

Tom Moberg M.S., Vice Provost of Information Technology Services

Charles D. Peterson, Pharm.D., Dean of the College of Pharmacy

Thomas J. Riley, Ph.D., Dean of the College of Arts, Humanities and Social Sciences

William Slanger, Ph.D., Director of Institutional Research and Analysis

Kerri Spiering, M.A., Director of International Programs Steven Venette, Interim Director of the Group Decision Center

Alan White, Ph.D., Dean of the College of Science and Mathematics

David Wittrock, Ph.D., Interim Dean of Graduate School and Interim Dean of University Studies

Patricia A. Jensen, J.D., Vice President and Dean for the College of Agriculture, Food Systems, and Natural Resources

David L. Berryhill, Ph.D., Director of Special Programs

Kenneth F. Grafton, Ph.D., Director of the N.D. Agricultural Experiment Station

Robert L. Harrold, Ph.D., Assistant Dean for Academic Programs

Duane Hauck, M.S., Director of the Extension Service

James R.Venette, Ph.D., Associate Dean for Academic Programs

Richard L. Rayl, B.A., Vice President for Business and Finance

Thomas J.Akers, M.S., Director of Purchasing

Bruce S. Frantz, B.S., Director of Facilities Management Timothy A. Lee, B.S., Chief of Police

Broc T. Lietz, B.S., Director of Human Resources

David J. Martin, B.A., Director of Student Loan

Collections

Paula J.Thovson, B.S., Director of Budget

Gary L. Wawers, M.B.A., Controller

Philip Boudjouk, Ph.D., Vice President for Research, Creative Activities and Technology Transfer

Gregory J. McCarthy, Associate Vice President, Interdisciplinary Research/CNSE/CATTT

Bonnie M. Neas, M.B.A., Assistant Vice President, Federal Government Relations/Internet Research/CHPC

Valrey V. Kettner, J.D., Assistant Vice President, Sponsored Programs Administration

David R. Givers, M.S., Interim Project Director, ND EPSCoR

Tony Grindberg, Executive Director, Research Technology Park, Inc.

Dale F. Zetocha, M.S., Executive Director, Technology Transfer/Research Foundation

George H. Wallman, Ph.D., Vice President for Student Affairs

Gary A. Narum, Ed.D., Associate Vice President for Student Affairs and Director of the Wellness Center Catherine S. Haugen, Ph.D., Dean of Enrollment

Management and Director of Admission

Prakash C. Mathew, M.A., Dean of Student Life

Wendy Clarin, B.A., Support Services Manager, Dining Services

Jaclynn Davis-Wallette, B.A., Interim Director of Multicultural Student Services

Jack Donahue, B.S./B.A., Director of Dining Services Margaret (Peggy) K. Gaynor, Ed. Spec., Director of Counseling and Disability Services

Michael Harwood, M.S., Director of Residence Life James Kennedy, B.S., Director of Student Financial Services

Allyn W. Kostecki, M.B.A., Director of TRIO Programs Barbara Lonbaken, M.S., RN, Director of Student Health Service and Wellness Education Janna M. Mausolf Stoskopf, M.S., Director of Memorial Union

Carol Miller, B.S., Director of the Varsity Mart Laura Oster-Aaland, M.S., Director of Orientation and Student Success

Deanne Sperling, B.S., Coordinator of University Conference Programs

Jill Wilkey, B.S., Director of the Career Center

Kristi Wold-McCormick, Ph.D., Registrar

Nona L.Wood, M.S.Ed., Associate Director of Student Rights and Responsibilities

Keith Bjerke, B.S., Vice President for University Relations

Laura McDaniel, M.S., Director of Marketing Communication

David C. Wahlberg, M.S., Director of University News

College of Agriculture, Food Systems, and Natural Resources

Aakre, Dwight G., Farm Management Specialist, Agribusiness and Applied Economics *M.S., 1982, North Dakota State University*

Adams, Terrance S., Adjunct Professor of Entomology Ph.D., 1966, University of California, Riverside

Adhikari, Tika B., Assistant Professor of Plant Pathology Pb.D., 1991, IRRI/UPLB, The University of Philippines

Anderson, Albin W., Emeritus Professor of Entomology Pb.D., 1969, Iowa State University

Anderson, Donald E., Emeritus Professor of Agribusiness and Applied Economics

Pb.D., 1968, University of Minnesota

Anderson, James V., Adjunct Professor of Plant Sciences, USDA

Pb.D., 1990, Virginia Polytechnic Institute

Anderson, Ronald, Emeritus Professor of Agribusiness and Applied Economics

Pb.D., 1971, Washington State University

Anderson, Vernon L., Adjunct Professor of Animal and Range Sciences

Ph.D., 1998, North Dakota State University

- Backer, Leslie E, Associate Professor of Agricultural and Biosystems Engineering, Interim Department Chair *M.S.*, 1972, North Dakota State University
- Banasik, Orville, J., Emeritus Professor of Cereal Science M.S., 1947, North Dakota State University
- Bangsund, Dean A., Research Scientist in Agribusiness and Applied Economics

M.S., 1987, North Dakota State University

- Barker, William T., Professor of Animal and Range Sciences Pb.D., 1968, University of Kansas
- Bauer, Marc L., Associate Professor of Animal and Range Sciences

Ph.D., 1996, University of Kentucky

Beladi, Hamid, Research Professor for Center for Agriculture, Policy and Trade Studies *Ph.D., 1983, Utab State University*

Berg, Ivan E., Emeritus Professor of Veterinary and Microbiological Sciences

D.V.M., 1960, University of Minnesota

Berg, Paul T., Associate Professor of Animal and Range Sciences

Ph.D., 1975, North Dakota State University

Berglund, Duane R., Professor of Plant Sciences Ph.D., 1971, North Dakota State University

Berry, Eugene S., Associate Professor of Veterinary and Microbiological Sciences

Berryhill, David L., Associate Professor of Animal Range

Ph.D., 1983, Northeastern University

Ph.D., 1971, Iowa State University

Sciences

Sciences

Science and Director of Special Programs

Berzonsky, William A., Associate Professor of Plant

Ph.D., 1988, University of Missouri-Columbia

Biondini, Mario E., Professor of Animal and Range

Boe, Arthur A., Emeritus Professor of Plant Sciences

Pb.D., 1983, Colorado State University

Pb.D., 1966, Utab State University

- Boetel, Mark A., Assistant Professor of Entomology Ph.D., 1996, South Dakota State University
- Bon, Thomas A., Senior Lecturer in Agricultural and Biosystems Engineering M.S., 1980, North Dakota State University
- Bradley, Carl A., Assistant Professor of Plant Pathology Ph.D., 2001, University of Illinois
- Brewer, Gary J., Professor of Entomology; Department Chair

Ph.D., 1984, Kansas State University

- Brun, Lynn J., Emeritus Professor of Soil Science, Department Chair *Ph.D., 1972, Kansas State University*
- Bugbee, William M., Emeritus Adjunct Professor of Plant Pathology, USDA Pb.D., 1965, University of Minnesota
- Cai, Xiwen, Assistant Professor of Plant Sciences Ph.D., 1998, Washington State University
- Campbell, Larry G., Adjunct Professor of Plant Sciences, USDA
- Pb.D., 1974, Kansas State University
- Carena, Marcelo J., Assistant Professor of Plant Sciences Pb.D., 1999, Iowa State University
- Carlson, Robert B., Emeritus Professor of Entomology Pb.D., 1965, Michigan State University
- Carr, Patrick M., Adjunct Professor of Plant Sciences Pb.D., 1989, Montana State University
- Carter, Jack F., Emeritus Professor of Plant Sciences Pb.D., 1950, University of Wisconsin
- Casey, Francis, Assistant Professor of Soil Science Pb.D., 2000, Iowa State University
- Caton, Joel S., Professor of Animal and Range Sciences Pb.D., 1987, New Mexico State University
- Cattanach, Allan W., Adjunct Professor of Soil Science Pb.D., 1979, University of Minnesota
- Cattanach, Norman R., Research Assistant in Soil Science B.S., 1982, University of Wisconsin-River Falls
- Chakraborty, Monisha, Assistant Professor of Plant Sciences

Pb.D., 1997, University of Hong Kong

- Chandler, Laurence D., Adjunct Professor of Entomology Pb.D., 1986, Texas A & M University
- Chang, Kow-Ching, Professor of Cereal and Food Sciences Pb.D., 1980, University of Nebraska
- Chao, Shiaoman, Adjunct Professor of Plant Sciences, USDA
- Pb.D., 1984, North Carolina State University
- Chao, Wun Shaw, Adjunct Professor of Plant Sciences, USDA
- Ph.D., 1996, University of California-Davis
- Charlet, Laurence D., Adjunct Professor of Entomology Pb.D., 1975, University of California, Riverside
- Cho, Gue Dae, Research Assistant Professor for the Center for Agriculture, Policy and Trade Studies *Pb.D.*, 2001, Obio State University
- Christian, Gary R., Adjunct Professor of Veterinary and Microbiological Sciences D.V.M., 1969, University of Minnesota
- Christoffers, Michael J., Assistant Professor of Plant Sciences
- Pb.D., 1998, University of Missouri-Columbia
- Cihacek, Larry J., Associate Professor of Soil Science *Pb.D.*, 1979, Iowa State University
- Cobia, David W., Emeritus Professor of Agribusiness and Applied Economics

Ph.D., 1967, Purdue University

- Coleman, William W., Adjunct Professor of Animal and Range Sciences M.S., 1975, Pennsylvania State University
- Colville, Thomas P., Professor of Animal and Range
- Sciences D.V.M., 1971, University of Minnesota
- M.S., 1981, University of Stirling, Scotland
- Cross, Harold Z., Emeritus Professor of Plant Sciences Pb.D., 1971, University of Missouri

- Dahl, Bruce L., Research Scientist in Agribusiness and Applied Economics
- M.S., 1989, North Dakota State University
- Dahleen, Lynn S., Adjunct Professor of Plant Sciences, USDA
- Ph.D., 1989, University of Minnesota
- Dahnke, William C., Emeritus Professor of Soil Science Pb.D., 1962, University of Wisconsin
- Dai, David W., Assistant Professor of Plant Sciences Pb.D., 2001 North Dakota State University
- Danielson, Russell B., Associate Professor of Animal and Range Sciences
- M.S., 1973, North Dakota State University del Rio Mendoza, Luis, Associate Professor of Plant
- Pathology Pb.D., 1999, Iowa State University
- D'Appolonia, Bert L., Emeritus Professor of Cereal Science
- Ph.D., 1968, North Dakota State University
- Deckard, Edward L., Professor of Plant Sciences Ph.D., 1970, University of Illinois
- Deibert, Edward J., Emeritus Professor of Soil Science Ph.D., 1976, University of Nebraska
- DeVuyst, Cheryl, Assistant Professor of Agribusiness and Applied Economics
- Ph.D., 2000, University of Illinois DeVuyst, Eric, Associate Professor of Agribusiness and
- Applied Economics Pb.D., 1993, Purdue University
- Dexter, Alan G., Professor of Plant Sciences Pb.D., 1969, University of Illinois
- Disrud, Lowell A., Assistant Professor of Agricultural and Biosystems Engineering *M.S., 1969, Kansas State University*
- Doehlert, Douglas C., Adjunct Professor of Plant Sciences, USDA
- Pb.D., 1982, University of Wisconsin
- Duysen, Murray E., Emeritus Professor of Plant Sciences Pb.D., 1966, University of Nebraska
- Dyer, Neil W., Associate Professor of Veterinary and Microbiological Sciences
- D.V.M., 1997, Iowa State University Edwards, Michael C., Adjunct Professor of Plant Pathology
- Ph.D., 1983, Cornell University
- Elias, Elias M., Professor of Plant Sciences Ph.D., 1987, North Dakota State University
- Enz, John W., Professor of Soil Science Pb.D., 1976, University of Minnesota
- Erickson, Duane O., Emeritus Professor of Animal and Range Sciences
- Ph.D., 1965, North Dakota State University
- Erlandson, Gordon W., Emeritus Professor of Agribusiness and Applied Economics *Pb.D., 1968, University of Minnesota*
- Fanning, Carl D., Emeritus Professor of Soil Science Ph.D., 1965, University of Wisconsin
- Faris, Justin D., Adjunct Professor of Plant Sciences, USDA Pb.D., 1999, Kansas State University
- Finley, John, Adjunct Professor of Animal and Range Sciences
- Ph.D., 1989, Washington State University
- Flaskerud, George, Professor of Agribusiness and Applied Economics
- Ph.D., 1970, Oklahoma State University
- Foley, Michael E., Adjunct Professor of Plant Sciences, USDA
- Ph.D., 1982, University of Illinois
- Foster, A. Earl, Emeritus Professor of Plant Sciences Ph.D., 1958, South Dakota State University
- Foster, Stephen P., Associate Professor of Entomology Pb.D., 1983, University of Waikato, New Zealand
- Fox, Sheri E., Water Quality Specialist M.S., 2002, North Dakota State University
- Franckowiak, Jerome D., Professor of Plant Sciences *Pb.D.*, 1970, University of Wisconsin
- Franzen, David W., Associate Professor of Soil Science Pb.D., 1993, University of Illinois

- Freeman, Douglas A., Professor, Department Head of Veterinary and Microbiological Sciences and Head of Veterinary Diagnostic Services
- D.V.M., 1983, University of Minnesota
- Ph.D., 1991, Washington State University/University of Idabo
- Freeman, Thomas P., Professor of Plant Pathology Pb.D., 1968, Arizona State University
- Friesen, Timothy L., Adjunct Professor of Plant Pathology, USDA
- Ph.D., 2001, University of Georgia
- Frohberg, Richard C., Emeritus Professor of Plant Sciences
- Pb.D., 1964, Iowa State University
- Funke, Berdell R., Emeritus Professor of Veterinary and Microbiological Sciences *Pb.D.*, 1964, Kansas State University
- Gibbs, Penelope S., Assistant Professor of Veterinary and Microbiological Sciences *Pb.D., 2001, University of Georgia*
- Giles, Joseph F., Associate Professor of Soil Science Pb.D., 1974, Colorado State University
- Glogoza, Phillip A., Associate Professor of Entomology Ph.D., 1996, North Dakota State University
- Goos, Robert J., Professor of Soil Science Ph.D., 1980, Colorado State University
- Grafton, Kenneth F., Professor of Plant Sciences; Director; AES
- Pb.D., 1980, University of Missouri

Poland

USDA

Economics

Sciences

Sciences

Range Sciences

Range Sciences

Applied Economics

Sciences, USDA

Range Sciences

- Grant, Linda A., Adjunct Professor of Cereal and Food Sciences, USDA
- Pb.D., 1989, North Dakota State University

Pb.D., 1983, Colorado State University

Pb.D., 1978, Iowa State University

Pb.D., 1986, University of Illinois

and Microbiological Sciences

Microbiological Sciences

Gustad, Thomas R., Lecturer in Veterinary

M.S., 1992, North Dakota State University

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Hammond, James J., Professor of Plant Sciences

Pb.D., 1987, North Dakota State University

Pb.D., 1986, Michigan State University

Pb.D., 1967, Purdue University

Pb.D., 1993, Iowa State University

M.S., 1970, Iowa State University

Pb.D., 1996, University of Nebraska

Pb.D., 1969, University of Nebraska

Haggart, Janice J., Senior Lecturer in Veterinary and

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Hareland, Gary A., Adjunct Professor of Cereal and Food

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M.S., 1958, North Dakota State University

Pb.D., 1995, University of Minnesota

Gudmestad, Neil C., Professor of Plant Pathology

Ph.D., 1982, North Dakota State University

Grazul-Bilska, Anna, Associate Professor of Animal and Range Sciences Pb.D., 1983, University of Agriculture and Technology,

Grygiel, Carolyn E., Associate Professor of Animal and

Gulya, Thomas J., Adjunct Professor of Plant Pathology,

Gustafson, Cole R., Professor of Agribusiness and Applied

Helgeson, Delmer L., Emeritus Professor of Agribusiness and Applied Economics

Ph.D., 1971, University of Nebraska

- Hellevang, Kenneth, Professor of Agricultural and Biosystems Engineering *Ph.D., 1989, North Dakota State University*
- Helms, Theodore C., Professor of Plant Sciences Ph.D., 1986, Iowa State University
- Henson, Robert A., Adjunct Professor of Plant Sciences Ph.D., 1983, University of Minnesota
- Herman, Dale E., Professor of Plant Sciences *Pb.D.*, 1966, Purdue University
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Pb.D., 1975, Duke University

- Higgins, Kenneth, Adjunct Professor of Animal and Range Sciences
- *Ph.D., 1980, North Dakota State University* Hirning, Harvey J., Emeritus Professor of Agricultural and Biosystems Engineering

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Hodur, Nancy M., Research Associate in Agribusiness and Applied Economics

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Hofman, Vernon L., Associate Professor of Agricultural and Biosystems Engineering

M.S., 1969, North Dakota State University Holland, Neal S., Emeritus Professor of Plant Sciences

- M.S., 1960, North Dakota State University
- Hopkins, David G., Associate Professor of Soil Science Ph.D., 1997, North Dakota State University
- Horsley, Richard D., Professor of Plant Sciences Ph.D., 1988, North Dakota State University
- Horvath, David P., Adjunct Professor of Plant Sciences, USDA

Pb.D., 1993, Michigan State University

Hosford, Robert, Emeritus Professor of Plant Pathology Pb.D., 1965, University of Arizona

Howatt, Kirk A., Assistant Professor of Plant Sciences Pb.D., 1999, Colorado State University

Hu, Jinguo, Adjunct Professor of Plant Sciences, USDA Pb.D., 1975, University of California - Davis

Hughes, Harlan, Emeritus Professor of Agribusiness and Applied Economics

Ph.D., 1971, University of Missouri

Jan, Chao-Chien, Adjunct Professor of Plant Sciences, USDA

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- Jaronsky, Stefan T., Adjunct Professor of Entomology Pb.D., 1978, Cornell University
- Jauhar, P.P., Adjunct Professor of Plant Sciences, USDA Pb.D., 1963, Indian Agricultural Institute, New Delbi, India

Jensen, Patricia A., Vice President and Dean for College of Agriculture, Food Systems, and Natural Resources J.D., 1978, William Mitchell College of Law

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- Johnson, Brian E., Research Associate in Soil Science M.S., 1985, North Dakota State University
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- Johnson, Dexter W., Emeritus Professor of Agricultural and Biosystems Engineering *Pb.D., 1983, Oregon State University*
- Johnson, Jerome E., Emeritus Professor of Agribusiness and Applied Economics *Pb.D.*, 1970, University of Minnesota

Johnson, LaDon J., Emeritus Professor of Animal and Range Sciences

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 Kaitibie, Simeon, Research Assistant Professor of Agribusiness and Applied Economics
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- Kegode, George O., Assistant Professor of Plant Sciences Ph.D., 1995, Iowa State University
- Khaitsa, Margaret L., Assistant Professor of Veterinary and Microbiological Sciences *Pb.D., 1999, The Obio State University*
- Khan, Khalil, Professor of Cereal and Food Sciences Pb.D., 1977, University of Manitoba, Canada
- Khan, Mohamed, Assistant Professor of Soil Science Ph.D., 1998, Clemson University
- Kianian, Shahryar, Associate Professor of Plant Sciences Pb.D., 1990, University of California-Davis
- Kiesling, Richard L., Emeritus Professor of Plant Pathology Pb.D., 1952, University of Wisconsin
- Kirby, Donald R., Professor of Animal and Range Sciences; Interim Department Chair, Cereal and Food Sciences; Assistant Director, AES *Pb.D.*, 1980, Texas A&M University
- Klotz, Karen L., Adjunct Professor of Plant Sciences, USDA Pb.D., 1995, Obio State University

Knodel, Janet J., Adjunct Professor of Entomology M.S., 1983, Virginia Polytechnic Institute and State University

- Koch, Kim, B., Adjunct Professor of Animal and Range Sciences
- Pb.D., 1990, Kansas State University
- Koo, Won W., Professor of Agribusiness and Applied Economics; Director of the Center for Agriculture, Policy, and Trade Studies *Pb.D.*, 1974, Iowa State University
- Krupinsky, Joseph M., Adjunct Professor of Plant Pathology, USDA
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- Kucera, Henry L., Emeritus Professor of Agricultural and Biosystems Engineering
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- Lamey, H.Arthur, Emeritus Professor of Plant Pathology Pb.D., 1954, University of Wisconsin
- Lardy, Gregory P., Associate Professor of Animal and Range Sciences
- Pb.D., 1997, University of Nebraska

Laschkewitsch, Barbara A., Specialist in Plant Sciences *M.S., 2000, North Dakota State University*

- Lee, Chiwon W., Professor of Plant Sciences Pb.D., 1977, Purdue University
- Leistritz, F. Larry, Professor of Agribusiness and Applied Economics
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- Leitch, Rebecca L., Senior Lecturer in Agribusiness and Applied Economics M.S., 1994. North Dakota State University
- Leopold, Roger A., Adjunct Professor of Entomology Ph.D., 1967, Montana State University
- Li, Deying M., Assistant Professor of Plant Sciences Pb.D., 2001, Iowa State University
- Liebig, Mark, Adjunct Professor of Soil Science Pb.D., 1998, University of Nebraska
- Lindgren, Jon G., Emeritus Professor of Agribusiness and Applied Economics
- Pb.D., 1968, University of Missouri
- Lindley, James A., Emeritus Associate Professor of Agricultural and Biosystems Engineering *Pb.D.*, 1972, *Purdue University*

- Logue, Catherine M., Assistant Professor of Veterinary and Microbiological Sciences
 - Ph.D., 1996, University of Ulster at Jordanstown, United Kingdom
- Lorenz, Russell L., Adjunct Professor of Animal and Range Sciences
 - Pb.D., 1970, North Dakota State University
- Lulai, Edward C., Adjunct Professor of Plant Sciences, USDA
- Ph.D., 1978, North Dakota State University
- Lund, H. Roald, Emeritus Professor of Plant Sciences Pb.D., 1965, Purdue University
- Lundstrom, Darnell R., Professor of Agricultural and Biosystems Engineering
- Ph.D., 1988, North Dakota State University Lym, Rodney G., Professor of Plant Sciences
- Ph.D., 1979, University of Wyoming
- Maan, Shivcharan S., Emeritus Professor of Plant Sciences Pb.D., 1961, Kansas State University
- Mack, Lawrence E., Lecturer in Agribusiness and Applied Economics
- Ph.D., 1969, University of Arizona
- MacRae, Ian V., Adjunct Professor of Entomology Ph.D., 1994, Oregon State University
- Maher, George G., Extension Specialist in Agricultural and Biosystems Engineering
- M.S., 1987, North Dakota State University Manthey, Frank A., Associate Professor of Plant Sciences
- Ph.D., 1985, North Dakota State University
- Marchello, Martin J., Professor of Animal and Range Sciences
- Ph.D., 1968, Virginia Polytechnic Institute and State University
- Mattson, Jeremy W., Research Assistant in Agribusiness and Applied Economics
- M.S., 2000, North Dakota State University
- McBride, Dean K., Emeritus Professor of Entomology M.S., 1965, North Dakota State University
- McClean, Phillip E., Professor of Plant Sciences Pb.D., 1982, Colorado State University
- McDonald, Clarence E., Emeritus Professor of Cereal Science

McDonald, Hugh J., Emeritus Professor of Agribusiness

McDonald, Ian C., Adjunct Professor of Entomology, USDA

Ph.D., 1968, Virginia Polytechnic Institute and State

Pb.D., 1969, Obio State University-Columbus

McEvoy, John, Assistant Professor of Veterinary and

McMullen, Marcia P., Associate Professor of Plant

Pb.D., 1983, North Dakota State University

Pb.D., 1976, University of Minnesota

Ph.D., 1991, Colorado State University

McMullen, Michael S., Associate Professor of Plant

Mergoum, Mohamed, Associate Professor of Plant

Merrill, Stephen D., Adjunct Professor of Soil Science

Pb.D., 1976, University of California-Riverside

Messersmith, Calvin G., Professor of Plant Sciences

Miljkovic, Dragan, Associate Professor of Agribusiness and

Miller, James D., Adjunct Professor of Plant Pathology,

Miller, Jerry F, Adjunct Professor of Plant Sciences, USDA

Mita, Dath, GIS/Remote Sensing Specialist, Water Quality

Pb.D., 1971, North Dakota State University

Pb.D., 1976, North Dakota State University

M.S., 1998, North Dakota State University

Pb.D., 1970, North Dakota State University

Meyer, Dwain W., Professor of Plant Sciences

Pb.D., 1970, Iowa State University

Pb.D., 1996, University of Illinois

Applied Economics

USDA

Project

Pb.D., 2002, University of Ulster, Jordanstown Co.,

Pb.D., 1957, Purdue University

and Applied Economics

Microbiological Sciences

Antrim, Northern Ireland

University

Pathology

Sciences

Sciences

- Moilanen, Charles W., Emeritus Professor of Agricultural and Biosystems Engineering
- M.S., 1963, North Dakota State University
- Moore, Bert L., Associate Professor of Animal and Range Sciences
- *Ph.D., 1975, North Dakota State University* Moraghan, John T., Professor of Soil Science
- Pb.D., 1961, Iowa State University Nalewaia, John D., Emeritus Professor of Plant Sciences
- Ph.D., 1962, University of Minnesota
- Neate, Stephen M., Associate Professor of Plant Pathology Pb.D., 1985, University of Adelaide
- 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 *Pb.D.*, 1971, Obio State University
- Nganje, William, Assistant Professor of Agribusiness and
- Applied Economics Ph.D., 1998, University of Illinois-Urbana Champaign
- Nichols, Kristine, Adjunct Professor of Soil Science Pb.D., 2003, University of Maryland
- Nowatzki, John F, Water Quality Specialist, Agricultural and Biosystems Engineering *M.S.*, 1974, North Dakota State University
- Nyren, Paul E., Adjunct Professor of Animal and Range
- Sciences M.S., 1975, Washington State University
- Nystuen, Peder A., Emeritus Associate Dean of Agriculture M.S., 1956, North Dakota State University
- Odde, Kenneth G., Professor and Head of Department of Animal and Range Sciences
- D.V.M., 1982; Ph.D., 1983, Kansas State University Ode, Paul L.Assistant Professor of Entomology
- Ph.D., 1994, University of Wisconsin Madison
- Olson, Denise L., Assistant Professor of Entomology Pb.D., 1994, Kansas State University
- O'Relley, Z. Edward, C.P.A., C.M.A., Ph.D., Professor of Agribusiness and Applied Economics *Pb.D.*, 1972, University of Tennessee
- O'Rourke, Katherine, Adjunct Professor of Animal and Range Sciences
- Ph.D., 1987, Washington State University
- Ostenson, Thomas K., Emeritus Professor of Agribusiness and Applied Economics *M.S.*, 1966, North Dakota State University
- Panigrahi, Suranjan, Associate Professor of Agricultural
- and Biosystems Engineering Ph.D., 1992, Iowa State University
- Park, Chung S., Professor of Animal and Range Sciences Pb.D., 1975, Virginia Polytechnic Institute and State University
- Petry, Timothy A., Associate Professor of Agribusiness and Applied Economics *M.S., 1973, North Dakota State University*
- Pratt, George, L., Emeritus Professor of Agricultural and Biosystems Engineering
- Pb.D., 1967, Oklaboma State University
- Promersberger, William J., Emeritus Professor of Agricultural and Biosystems Engineering *M.S., 1941, Kansas State University*
- Pruess, Birgit, Assistant Professor of Veterinary and Microbiological Sciences Pb.D., 1991, Institut for Physiologische Chemie, Ruhr-Universitat, Bochum Germany
- Prunty, Lyle D., Professor of Soil Science Pb.D., 1978, Iowa State University
- Purdy, Clare H., Lecturer of Animal and Range Sciences M.S., 1982, California Polytechnic State University
- Rasmussen, Jack B., Assistant Professor of Plant Pathology Pb.D., 1987, Michigan State University
- Rathge, Richard W., Professor of Sociology and Agribusiness and Applied Economics *Ph.D., 1981, Michigan State University*
- Redmer, Dale A., Professor of Animal and Range Sciences Pb.D., 1983, University of Missouri

- Reff,Tommy L., Emeritus Professor of Agribusiness and Applied Economics
- M.S., 1968, North Dakota State University
- Reinhiller, Merril J., Adjunct Professor of Veterinary and Microbiological Sciences
- D.V.M., 1969, Iowa State University Reynolds, Lawrence P., Professor of Animal and Range
- Sciences Ph.D., 1983, Iowa State University
- Rice, Billy B., Emeritus Professor of Agribusiness and Applied Economics
- M.S., 1965, North Dakota State University Richardson, Jimmie L., Professor of Soil Science;
- Department Chair Ph.D., 1974, Iowa State University
- Richman, Rachel L., Lecturer in Veterinary and Microbiological Sciences
- M.S., 2002, University of Minnesota Rider, David A., Associate Professor of Entomology Pb.D., 1988, Louisiana State University
- Riemann, John G., Adjunct Professor of Entomology, USDA Pb.D., 1961, University of Texas
- Ringwall, Kris A., Associate Professor of Animal and Range Sciences
- Pb.D., 1985, Oklaboma State University Rivera, Viviana V., Research Assistant of Plant Pathology
- M.S., 2000, North Dakota State University
- Roehrdanz, Richard, Adjunct Professor of Entomology Pb.D., 1974, University of Wisconsin - Madison
- Saxowsky, David M., Associate Professor of Agribusiness and Applied Economics J.D., 1979, Obio State University
- Scherer, Thomas, Associate Professor of Agricultural and Biosystems Engineering
- *Pb.D., 1986, University of Minnesota* Schneiter, Albert A., Professor of Plant Sciences;
- Department Head Pb.D., 1973, The University of Arizona
- Schroeder, Jerome (J.W.) W., Extension Specialist in Animal and Range Sciences *Pb.D., 1999, North Dakota State University*
- Schuh, Jane, Assistant Professor of Veterinary and Microbiological Sciences
- Pb.D., 2000, North Dakota State University
- Schulz, John T., Emeritus Professor of Entomology Ph.D., 1957, Iowa State University
- Schwarz, Paul B., Professor of Plant Sciences Pb.D., 1987, North Dakota State University
- Secor, Gary A., Professor of Plant Pathology Pb.D., 1978, University of California-Davis
- Sedivec, Kevin K., Associate Professor of Animal and Range Sciences
- *Pb.D., 1994, North Dakota State University* Seelig, Bruce D., Extension Specialist in Agricultural and
- Biosystems Engineering Ph.D., 1989, North Dakota State University
- Seiler, Gerald J., Adjunct Professor of Plant Sciences, USDA Ph.D., 1980, North Dakota State University
- Shultz, Steve, Associate Professor of Agribusiness and Applied Economics
- Ph.D., 1992, University of Arizona
- Slanger, William D., Professor of Animal and Range Sciences; Director of Institutional Research and Analysis *Pb.D.*, 1975, Cornell University
- Sleeper, Bayard P., Emeritus Professor of Veterinary and Microbiological Sciences
- Pb.D., 1951, University of California Smith David L Adjunct Professor of Apin
- Smith, David J., Adjunct Professor of Animal and Range Sciences
- Pb.D., 1990, Washington State University
- Smith, Glenn S., Emeritus Professor of Plant Sciences Ph.D., 1947, University of Minnesota
- Smith, M. Herbert, Emeritus Professor of Veterinary and Microbiological Sciences
- D.V.M., 1962, University of Minnesota Ph.D., 1974, Iowa State University
- Smith, Ronald C., Professor of Plant Sciences Ph.D., 1973, Obio State University

- Solseng, Elton G., Instructor in Agricultural and Biosystems Engineering
 - M.S., 1980, North Dakota State University
- Sowokinos, Joseph R., Adjunct Professor of Plant Sciences; USDA
- Ph.D., 1969, University of North Dakota
- Spilde, LeRoy A., Emeritus Associate Professor of Plant Sciences
- Pb.D., 1975, North Dakota State University Stack, Robert W., Professor of Plant Pathology
- Pb.D., 1976, Cornell University
- Staricka, James A., Adjunct Professor of Soil Science Ph.D., 1990, University of Minnesota
- Statler, Glen D., Emeritus Professor of Plant Pathology Pb.D., 1969, University of Wyoming
- Steele, Dean D., Associate Professor of Agricultural and Biosystems Engineering
- Ph.D., 1991, University of Minnesota Stegman, Earl C., Emeritus Professor of Agricultural and
- Biosystems Engineering; Department Chair Ph.D., 1965, Michigan State University
- Stokka, Gerald L., Adjunct Professor of Animal and Range Sciences
- D.V.M., 1982, Iowa State University
- Stoltenow, Charles L., Associate Professor of Animal and Range Sciences D.V.M., 1985, Iowa State University
- Suttle, Jeffrey C., Adjunct Professor of Plant Sciences; USDA
- Pb.D., 1979, Michigan State University
- Sweeney, Michael D., Emeritus Professor of Soil Science M.S., 1961, North Dakota State University
- Swenson, Andrew L., Extension Specialist in Agribusiness and Applied Economics

Taylor, Richard D., Research Associate in Agribusiness and

Thompson, Asunta L., Assistant Professor of Plant Sciences

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Treat, Daniel P., Adjunct Professor of Veterinary and

Trooien, Todd P., Adjunct Professor of Agricultural

Tweeten, Kathleen, Community Economic Development

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Venette, James R., Professor of Plant Pathology; Associate

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M.S., 1981, North Dakota State University

Pb.D., 1986, North Dakota State University

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Pb.D., 1966, Oklaboma State University

D.V.M., 1971, University of Minnesota

Pb.D., 1988, Colorado State University

M.B.A., 1997, University of North Dakota

M.S., 1963, North Dakota State University

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Pb.D., 1969, Texas A&M University

Pb.D., 1961, Purdue University

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Pb.D., 1975, University of Minnesota

Pb.D., 1994, Michigan State University

Pb.D., 1992, Oregon State University

Ph.D., 1995, North Dakota State University

Pb.D., 1967, North Dakota State University

Ph.D., 1998, University of Idaho

M.S., 1984, University of Idabo

Microbiological Sciences

Applied Economics

Sciences

Engineering

Range Sciences

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Swenson, Larry J., Research Associate in Soil Science M.S., 1975, North Dakota State University Taylor, Ray, Research Associate in Plant Pathology

- Whitten, C. James, Adjunct Professor of Entomology, USDA
- Ph.D., 1974, Texas A&M University
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Pb.D., 1988, Rice University

- Williams, Michael Dale, Seedstocks Director, Plant Sciences
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- Wilson, William W., Professor of Agribusiness and Applied Economics Pb.D., 1980, University of Manitoba, Canada
- Windels, Carol E., Adjunct Professor of Plant Pathology
- Pb.D., 1980, University of Minnesota Witz, Richard L., Emeritus Professor of Agricultural and Biosystems Engineering
- M.S., 1942, Purdue University
- Wolf-Hall, Charlene, Assistant Professor of Veterinary and Microbiological Sciences
- Pb.D., 1995, University of Nebraska-Lincoln
- Xu, Steven S., Adjunct Professor of Plant Sciences, USDA Ph.D., 1994, North Dakota State University
- Yocum, George D., Adjunct Professor of Entomology Ph.D., 1992, Obio State University
- Youngs, Vernon L., Emeritus Professor of Cereal Science, USDA
- Pb.D., 1965, North Dakota State University Zeleznik, Joseph D., Extension Forester
- Pb.D., 2001, Michigan State University
- Zollinger, Richard K., Associate Professor of Plant Sciences
- Ph.D., 1989, Michigan State University
- Zubriski, Joseph C., Emeritus Professor of Soil Science Pb.D., 1951, University of Wisconsin

Agricultural Experiment Station

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- Atkinson, Lorilie M., Assistant Animal Scientist, North Central Research Extension Center *B.S., 2001, Minot State University*
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- Bradbury, Gordon, Research Specialist, Williston Research Extension Center B.S., 1974, North Dakota State University
- Carr, Patrick M., Associate Agronomist, Dickinson
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- Copenhaver, David, Research Specialist/Seedstocks.
- Carrington Research Extension Center B.S., 1985, North Dakota State University
- Dong, Xuejun, Assistant Range Scientist, Central Grasslands Research Extension Center *Ph.D.*, 1997, *Chinese Academy of Sciences*
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- Faller, Timothy C., Director/Animal Scientist, Hettinger Research Extension Center
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- Gibbs, Penelope S., Assistant Professor, Veterinary Diagnostic Services *Pb.D., 2001, University of Georgia*
- Gjellstad, Robert W., Research Specialist, North Central Research Extension Center, Minot B.S., 1977, North Dakota State University
- Grafton, Kenneth F., Director, Agricultural Experiment Station
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- Halley, Scott, Crop Protection Scientist, Langdon Research Extension Center M.S., 2000, North Dakota State University
- Halvorson, Mark A., Agronomist, North Central Research Extension Center, Minot
- *M.S., 1995, North Dakota State University* Hanson, Bryan K., Agronomist, Langdon Research
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- Hendrickson, Paul E., Research Specialist/Agronomy, Carrington Research Extension Center M.S., 1998, Oregon State University
- Henson, Robert, Associate Agronomist, Carrington Research Extension Center *Pb.D.*, 1983, University of Minnesota
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- Pb.D., 1995, University of Nebraska Kirby, Donald F.,Assistant Director, Agricultural Experiment Station
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- Landblom, Douglas G.,Associate Animal Scientist, Dickinson Research Extension Center
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- B.S., 2002, North Dakota State University Mostrom, Michelle S., Experiment Station Specialist in
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- Newell, Teresa K., Experiment Station Specialist in Veterinary Diagnostic Services *Pb.D., 1986, Kansas State University*
- Nudell, Daniel J., Assistant Agricultural Economist, Hettinger Research Extension Center M.S., 1998. North Dakota State University
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- Olson, Howard M., Emeritus Director, Carrington Research Extension Center
- M.S., 1950, Utab State University
- Patton, Bob D., Assistant Range Scientist, Central Grasslands Research Extension Center, Streeter M.S., 1986, University of Idabo
- Poland, Jr., Woodrow (Chip), Area Livestock Specialist, Dickinson Research Extension Center *Pb.D., 1991, South Dakota State University*

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- B.S., 1975, North Dakota State University
- Ringwall, Kris A., Director/Animal Scientist, Dickinson Research Extension Center and Associate Professor, Animal and Range Sciences Ph.D., 1985, Oklaboma State University
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- M.S., 1969, North Dakota State University
- Schatz, Blaine G., Director/Agronomist, Carrington Research Extension Center
- *M.S., 1988, North Dakota State University* Schauer, Christopher S., Post Doc in Animal and Range
- Sciences, Hettinger Research Extension Center Ph.D., 2003, Oregon State University
- Schoonmaker, Jon, Research Specialist/Livestock, Carrington Research Extension Center *Pb.D., 2003, Obio State University*
- Staricka, James A., Soil Scientist, Williston Research Extension Center
- Ph.D., 1990, University of Minnesota
- Stecher, Donald M., Research Specialist, Hettinger Research Extension Center
- B.S., 1983, North Dakota State University
- Teigen, Thomas I., Director/Agronomist, Agronomy Seed Farm, Casselton
- M.S., 1975, North Dakota State University
- Willoughby, Gary P., Research Specialist, North Central Research Extension Center, Minot *B.A., 1993, Minot State University*
- Zwinger, Steve F., Research Specialist/Agronomy, Carrington Research Extension Center B.S., 1982, North Dakota State University

NDSU Extension Service Administration/State Specialists

(See College of Agriculture, Food Systems, and Natural Resources and College of Human Development and Education sections for additional Extension faculty listings.)

- Bollinger, Bruce A., Extension Administration M.B.A., 1995, North Dakota State University
- Crawford, Ellen, Specialist, Agriculture Communication B.S., 1978, Minnesota State University Moorbead
- Egeberg, Roger D., Specialist, Agriculture Communication B.S., 1974, North Dakota State University
- Fisher, Jon Jay, Extension Administration M.S., 1977, North Dakota State University

Hauck, Duane D., Extension Administration

M.S., 1988, University of North Dakota

Mattern, Richard A., Specialist, Agriculture

M.S., 1994, North Dakota State University

M.S., 1980, North Dakota State University

M.S., 1986. North Dakota State University

Sturn, Gerald M., Extension Administration

B.A., 1984, University of North Dakota

M.S., 1985, University of North Dakota

Zotz, Karen L., Extension Administration

Ashley, Roger, Extension Area Specialist

Area Agents/Area Specialists

M.S., 1989, University of Arizona, Tucson

Ph.D., 1996, University of Illinois

Tweten, Margaret, Grand Forks

M.S., 1986, Kansas State University

Communication

M.S., 1983, North Dakota State University

Hvidsten, Marie G., Specialist, Rural Leadership

Koch, Becky, Specialist, Agriculture Communication

Rice, David G., Specialist, Agriculture Communication

Sundeen, Bruce W., Specialist, Agriculture Communication

Wald, Randall J., Specialist, Agriculture Communication

B.S., 1988, Minnesota State University Moorbead

Flage, Lynette J., Specialist, Center for Community Vitality B.S., 1993, University of North Dakota Berge-Buss, Rebecca S., Extension Agent and Parenting Resources Coordinator

M.S.W., 1998, University of Minnesota Dhuyvetter, John M., Extension Area Specialist M.S., 1984, Oklaboma State University

Endres, Gregory J., Extension Area Specialist M.S., 1993, North Dakota State University

Gregoire, Terry, Extension Area Specialist M.S., 1972, North Dakota State University

Hill, Chester L., Extension Area Specialist M.S., 1993, North Dakota State University

Hla, Aung K., Extension Area Specialist M.S., 1996, University of Arizona

Hoppe, Karl F, Extension Area Specialist Ph.D., 1990, South Dakota State University

Jenks, Brian M., Extension Area Specialist Ph.D., 1996, University of Nebraska-Lincoln

Johnson, Mary B., Extension Area Specialist M.S., 1988, University of Wyoming

Knodel, Janet J., Extension Area Specialist M.S., 1983, Virginia Polytechnic Institute and State University

Konerza, Judith, Extension Agent and Parenting Resources Coordinator

M.S., 2002, University of North Dakota Liane, Michael O., Irrigation Agent

B.S., 1979, North Dakota State University Manske, Llewellyn, Extension Area Specialist

Ph.D., 1980, North Dakota State University

McKay, Kent R., Extension Area Specialist M.S., 1989, North Dakota State University

Nilles, Dawnita S., Extension Area Specialist B.S., 1989, North Dakota State University

Poland, Woodrow W., Jr., Extension Area Specialist Ph.D., 1991, South Dakota State University

Preston, Duane, Extension Area Agent

M.S., 1972, North Dakota State University Radke, Rudolph, Extension Area Specialist B.S., 1971, North Dakota State University

Schmaltz, Kathleen M., Extension Agent and Parenting Resources Coordinator

B.S., 1987, North Dakota State University Theurer, Debra L., Extension Agent and Parenting Resources Coordinator

B.S., 1980, Dickinson State University

Wiederholt, Ron, Extension Area Specialist M.S., 1995, University of Wisconsin-Madison

Extension Agents and Counties

Anderson, Donna F., Foster and Eddy B.S., 1992, North Dakota State University

Anderson, Kaylyn M., LaMoure B.S., 1975, North Dakota State University

Anderson, Peggy, Burke and Divide B.S., 1980, North Dakota State University

Armstrong, Karen L., Rolette B.S., 1976, North Dakota State University

Askim, Craig A., Mercer B.S., 1994, North Dakota State University

Barondeau, Dwain A., Hettinger B.S., 1969, South Dakota State University

Baumann, Teresa A., Slope B.S., 2000, University of Wisconsin

Becker, Timothy A., Eddy B.S., 1988, North Dakota State University

Beneda, Ronald D., Cavalier B.S., 1978, North Dakota State University

Berdal, Kristi A., Nelson B.S., 1988, University of North Dakota

Bernhardt, Donna M., Grand Forks B.S., University of North Dakota

Bichler, Douglas M., Grant B.S., 2002 North Dakota State University

Biewer, Adrian J., Richland M.S., 1997, North Dakota State University Bjelland, Ellen, M., Barnes M.A., 1993, University of Missouri-Columbia Boerner, Colleen, Pembina B.S., 1972, University of Idabo Bowman, Andrea, Adams B.S., 2003, North Dakota State University Brown, Keith L., Divide B.S., 1982, North Dakota State University Brummond, Bradley T., Walsh B.S., 1982, North Dakota State University Bruns, Jodi R., Dickey B.S., 1994, North Dakota State University Buckley, Jackie A., Morton B.S., 1979, North Dakota State University Carpentier, Patrick E., McLean B.S., 1967, North Dakota State University Cogdill, Bradley D., Cass M.S., 2004, North Dakota State University Driessen, Daniel J., Grand Forks B.S., 1997, North Dakota State University Dugan-Dibble, Raquel R., McHenry B.S., 1996, North Dakota State University Elhard, Eugene, Dickey M.S., 1988, North Dakota State University Erickson, Cheyanne M., Fort Berthold B.S., 1998. Oklaboma State University Erickson, Karlyle, Pierce B.S., 1979, North Dakota State University Fagerholt, Susan L., Walsh B.S., 1973, North Dakota State University Folske, Daniel T., Burke B.S., 1980, North Dakota State University Froelich, Kurt L. Stark-Billings B.S., 1983, North Dakota State University Froelich, Warren J., Williams B.S., 1969, North Dakota State University Gette, Gayle L., Towner B.S., 1979, North Dakota State University Gienger, Clinton D., Traill B.S., 1974, North Dakota State University Gion, Brian F., Steele B.S., 1987, North Dakota State University Giermundson, Paul G., Fort Berthold B.S., 1999, North Dakota State University Green, Merry E., McHenry B.S., 1975, North Dakota State University Grueneich, Randy D., Barnes B.S., 1978, North Dakota State University Haadem, ElRoy E., Burleigh B.S., 1964, North Dakota State University Handegard, Jesse D., Adams B.S., 1999. North Dakota State University Hanson, Michael E., Emmons B.S., 1980, North Dakota State University Hassebroek, Julie E., Sargent B.S., 1981, North Dakota State University Hauge, Linda K., Williams B.S., 1974, North Dakota State University Hellandsaas, Marcia L., McKenzie and Dunn B.S., 1984, North Dakota State University Hennessy, James J., Mountrail B.S., 1987, North Dakota State University Hiam, Rachael L., Steele B.S., 1998, North Dakota State University Hodous, Bill T., Ramsey B.S., 2000, North Dakota State University Hoines, Vanessa G., Morton B.S., 1984, North Dakota State University Huot, Wilfred, Grand Forks M.S., 1976, University of Minnesota

Isbell, Susan A., Grant B.S., 1975, Montana State University Ketterling, Cynthia K., McIntosh B.S., 1985, North Dakota State University Kickertz-Gerbig, Sharon, Stark and Billings B.S., 1973, North Dakota State University Klapperich, Cindy, Barnes B.S., 1979, South Dakota State University Klein, William L., McIntosh B.S., 1979, North Dakota State University Kleven, Craig A., Kidder B.S., 2000, North Dakota State University Knoke, Scott D., Benson B.S., 1986, North Dakota State University Knox, Lisa J., Sargent B.S., 2002, North Dakota State University Kraft, June M., Burleigh M.S., 1991, Wheaton College Kringler, John C., Cass B.S., 1974, North Dakota State University Langerud, Brenda K., Ramsey B.S., 1974, North Dakota State University Larson, Jerry C., Stark and Billings B.S., 1969, North Dakota State University Lechler, Verona L., Sheridan B.S., 1962, North Dakota State University Lee, Debra K., Ransom B.S., 1978, North Dakota State University Lukach, Macine A., Cavalier B.S., 1976. North Dakota State University Lykken, Terrance, Towner B.S., 1968, North Dakota State University Maine, Richard P., Wells B.S., 1971, University of Idabo Melaas, Randall P., Pembina B.S., 1969, North Dakota State University Miller Floramay, Kidder B.S., 1972, Iowa State University Miller, Mark D., Rolette B.S., 1983, North Dakota State University Monson, Karla R., Bottineau B.S., 1981, North Dakota State University Naze, Dale W., McKenzie B.S., 1981, North Dakota State University Nichols, Kendall A., Grand Forks M.S., 1993, North Dakota State University Nordick, Maxine, Cass B.S., 1973, North Dakota State University Olson, NaTanya R., Dickey Pb.D., 1999, University of Wisconsin Madison Olson, Thomas M., Stutsman B.S., 1972, North Dakota State University Palczewski, Cathy S., Burleigh and Morton B.S., 1984, North Dakota State University Peterson, Harvey L., Golden Valley Pb.D., 1972, University of Nebraska Peterson, Nels M., Nelson B.S., 1976, North Dakota State University Rath-Wald, Carmen J., Logan and Emmons B.S., 1992, North Dakota State University Rettinger, Brenda L., Bowman B.S., 1996, Montana State University Rose, Michael N., Ward B.S., 1970, North Dakota State University Runner, JoAnn, Bowman and Slope B.S., 1958, North Dakota State University Sagaser, Stevan J., Grand Forks B.S., 1979, North Dakota State University Sahr, Eunice, Stutsman M.S., 1993, North Dakota State University Schaar, Margaret, Emmons B.A., 1977, University of North Dakota Scharmer, Lori A., Ward B.S., 1976, North Dakota State University Schaunaman, Crystal, Sheridan M.S., 2004, North Dakota State University

Schmidt, Richard J., Oliver B.S., 1993 North Dakota State University Semler, Timothy A., Bottineau B.S., 1974, North Dakota State University Siebert, Dale L., Richland M.S., 1986, North Dakota State University Slinde, Gail M., Ward B.S., 1973, North Dakota State University Steinhaus, Jenny L., Benson B.S., 2000, University of North Dakota Svingen, Colleen M., Richland B.S., 1980, North Dakota State University Swenson, John D., Griggs M.S., 1986, North Dakota State University Taylor, Brenda K., Grand Forks B.S., 1981, Bemidji State University Twist, David H., Dunn B.S., 1969, North Dakota State University Ulmer, Albert L., LaMoure B.S., 1981, North Dakota State University Ussatis, Rita A., Cass M.S., 1992, North Dakota State University Vander Wal, Sheila M., McLean B.S., 1993, South Dakota State University Voigt, LoAyne R., Renville B.S., 1984, North Dakota State University Weinmann, Todd, Cass B.S., 2000, South Dakota State University Ziegler, Rebecca E., Mercer M.S., 2004, North Dakota State University

College of Arts, Humanities and Social Sciences

Ambrosio, Thomas, Assistant Professor of Political Science Pb.D., 2000, University of Virginia

Amlund, Curtis A., Emeritus Professor of Political Science Pb.D., 1959, University of Minnesota

Anderson, Gerald D., Associate Professor of History Pb.D., 1973, University of Iowa

Andreini, Carol J., Professor of Classical Languages, Cardinal Muench Seminary *Pb.D., 1979, University of Minnesota*

Aune, Mark, Assistant Professor of English Ph.D., 2002, Wayne State University

Bauroth, Nicholas G., Assistant Professor of Political Science

Ph.D., 2003, Loyola University

Begnal, Kate, Lecturer of English

Ph.D., 1974, Pennsylvania State University

Birmingham, Elizabeth, Assistant Professor of English Pb.D., 2000, Iowa State University

Bonfield, June P., Emeritus Professor of English *Pb.D.*, 1969, University of Texas

Bouffard, Jeffrey A., Assistant Professor of Criminal Justice *Pb.D., 2000, University of Maryland*

Bouffard, Leana A., Assistant Professor of Criminal Justice *Pb.D., 2001, University of Maryland*

- Bovard, Richard W., Emeritus Professor of English Pb.D., 1973, University of Denver
- Brkic, Jovan, Emeritus Professor of Philosophy Ph.D., 1959, Columbia University

Bromley, Kimble A., Associate Professor of Art M.F.A., 1986, Southern Illinois University

Brooks, Kevin A., Associate Professor of English Pb.D., 1997, Iowa State University

Brown, Muriel J., Associate Professor of English Pb.D., 1971, University of Nebraska

Brunton, Bill B., Emeritus Professor of Anthropology Ph.D., 1974, Washington State University

Burnett, Ann, Associate Professor of Communication; Director of Women's Studies

Ph.D., 1986, University of Utab

Bye, John E., Instructor in Library Science; Curator of North Dakota Institute for Regional Studies; Archivist for North Dakota State University M.A., 1973, University of Wisconsin

Cater, A. Catherine, Emeritus Professor of English Ph.D., 1945, University of Michigan Cavins, Jo Wana, Lecturer in English B.A., 1979, University of Evansville, Indiana Chabora, Pamela D., Assistant Professor of Theatre Arts

- Ph.D., 1994, Michigan State University
- Clark, Jeffrey T., Professor of Anthropology Ph.D., 1987, University of Illinois
- Collins, Ross F, Associate Professor of Mass Communication

Pb.D., 1992, University of Cambridge, Britain Cooley, Dennis R., Assistant Professor of Philosophy

Ph.D., 1995, University of Rochester Corwin, Patricia A., Senior Lecturer in Sociology

- M.A., 1972, North Dakota State University
- Cosgrove, William E., Professor of English Pb.D., 1972, University of Iowa
- Danbom, David B., Distinguished Professor of History Ph.D., 1974, Stanford University
- Eidem, Orville M., Jr., Emeritus Professor of Music M.M.Ed., 1960, Vander Cook College of Music
- Erickson, M. Joy, Senior Lecturer in Theatre Arts; Assistant Director of Division of Fine Arts *M.Phil.*, 1969, Yale University
- Flood, Anthony, Assistant Professor of Philosophy, Cardinal Muench Seminary
- Ph.D., 2003, University of Oklahoma
- Fricker, Linda M., Lecturer in English C.A.S., 1986, Northern Illinois University
- Froelich, Andrew I., Professor of Music D.M.A., 1988, Michigan State University
- Goreham, Gary A., Professor of Sociology; Ph.D., 1985, South Dakota State University
- Grollman, Stephanie, Lecturer of German Pb.D., 1998, University of Iowa
- Groves, Robert W., Professor of Music Ph.D., 1981, University of Iowa
- Gupte, Manjusha, Assistant Professor of Political Science Pb.D., 2003, Purdue University
- Hageman, Jeanne K., Associate Professor of French Ph.D., 1991, University of Wisconsin-Madison
- Hall, Louise, Lecturer in English M.Ed., 1998, North Dakota State University
- Harvey, Mark, Professor of History Pb.D., 1986, University of Wyoming
- Hawley, D. Carlton, Assistant Professor of Spanish *Pb.D.*, 1999, University of Iowa
- Helgeland, John A., Professor of History and Religion Ph.D., 1973, University of Chicago
- Helstern, Linda, Assistant Professor of English Ph.D., 2001, Southern Illinois University
- Homan, Paul W., Associate Professor of French; Coordinator, Scholars Program; Department Chair, Modern Languages
- Pb.D., 1988, University of Kansas

Horvik, Lori A., Associate Professor of Theatre Arts M.F.A., 1994, Northern Illinois University

- Houts-Smith, Linda, Lecturer of English as a Second Language
- M.A.T., 1993, School for International Training Isern, Thomas D., Distinguished Professor of History
- Ph.D., 1977, Oklaboma State University
- Janecek, Kilbourn L., Emeritus Professor of Library Science
- M.A., 1951, University of Denver

Johnson, Roy D., Emeritus Professor of Music M.M., 1954, University of Illinois

- Johnson, Todd W., Lecturer and Technical Director of Theatre Arts
- B.A., 1997, North Dakota State University Johnston, Eunice, Senior Lecturer in English
- M.A., 1982, North Dakota State University Jones, Archer, Emeritus Professor of History
- Ph.D., 1958, University of Virginia
- Jones, Robert J., Associate Professor of Music D.M.A., 1991, University of Oklahoma
- Justitz, Gerritdina, Associate Professor of History Pb.D., 1996, University of California, San Diego

- Kapplinger, Kent, Associate Professor of Art M.F.A., 1991, University of Iowa
- Klenow, Daniel J., Professor of Sociology Pb.D., 1977, University of Notre Dame

Kloberdanz, Timothy J., Associate Professor of Anthropology

Pb.D., 1986, Indiana University Krishnan, Ramakrishnan S., Professor of English; Associate Vice President for Academic Affairs

Ph.D., 1981, University of Nebraska

- Laliberte, Reverend Robert L., Associate Professor of Philosophy and Humanities, Cardinal Muench Seminary Pb.D., 1997, University of St. Thomas, Rome
- Larew, Donald E., Professor of Theatre Arts; Artistic Director of Little Country Theatre *M.E.A., 1969, University of Iowa*
- Lifton, Paul, Associate Professor of Theatre Arts Pb.D., 1985, University of California, Berkeley
- Lindgren, H. Elaine, Professor of Sociology Ph.D., 1970, University of Missouri
- Littlefield, Robert S., Professor of Speech Communication Pb.D., 1983, University of Minnesota
- Lyons, Michael J., Emeritus Professor of History *Pb.D.*, 1969, University of Minnesota
- Mack, Kyle D., Associate Professor of Music; Associate Director of Bands
- D.A., 1992, Ball State University
- Martinson, David, Lecturer in English B.A., 1968, Moorbead State University
- Matchie, Thomas F., Emeritus Professor of English *Pb.D.*, 1974, University of Wisconsin
- Mattern, Jody, Lecturer in Communication M.S., 2000, North Dakota State University
- McDonald, Thomas D., Professor of Criminal Justice Ph.D., 1972, Southern Illinois University
- McEnery, Deona, Lecturer in English M.A., 2001, North Dakota State University
- Meister, Mark A., Associate Professor of Speech Communication
- Ph.D., 1997, University of Nebraska
- Miller, E. John, Professor of Music; Director of Division of Fine Arts
- Pb.D., 1992, Northwestern University
- Miller, Jo Ann, Professor of Music; Director of Choral Activities
- D.M.A., 1989, Conservatory of Music, University of Cincinnati
- Miller, Michael M., Assistant Professor of Library Science; Germans from Russia Bibliographer *M.Ed.*, 1967, University of North Dakota *M.S.*, 1969, University of North Dakota
- Monzingo, John E., Emeritus Professor of Political Science Pb.D., 1976, Claremont Graduate School
- Mueller, Neil R., Assistant Professor of Music D.M.A., 1999, Boston University School for the Arts
- Musiba, Charles M., Assistant Professor of Anthropology Pb.D., 1999, University of Chicago
- Nelson, Paul E., Professor and Chair of Communication Pb.D., 1968, University of Minnesota
- Nichipor, Walter N., Associate Professor of Classical Languages, Cardinal Muench Seminary *Ph.D.*, 1975, Harvard University
- Nichols, Cindy J., Senior Lecturer in English M.E.A., 1981, University of Iowa

O'Connor, Robert, Professor of English

of Bands

Pb.D., 1979, Bowling Green State University

Okigbo, Charles, Professor of Communication

Pb.D., 1982, Southern Illinois University

Pb.D., 1992, Florida State University

Norris, Jim D., Associate Professor of History Ph.D., 1992, Tulane University

- O'Connor, Amy, Assistant Professor of Communication Pb.D., 2003, Purdue University
- O'Connor, Patricia, Emeritus Professor of Library Science M.A.L.S., 1956, College of St. Catherine

Olfert, Warren D., Assistant Professor of Music; Director

- Olson, Robert W., Emeritus Professor of Music D.M.A., 1973, University of Illinois
- Oyola-Yemaiel, Arthur, Assistant Professor of Emergency Management Pb.D., 1999, Florida International University
- Patnode, Matthew A., Assistant Professor of Music
- D.M.A., 2000, Arizona State University Pearson, Carol, Associate Professor of Spanish Pb.D., 1998, University of New Mexico
- Pearson, Judy C., Professor of Communication; Associate Dean of Arts, Humanities, and Social Sciences *Pb.D.*, 1975, Indiana University
- Peet, Howard D., Emeritus Professor of English M.S., 1965, Moorhead State University
- Peterson, Debra, Assistant Professor of English Pb.D., 2003, Wayne State University
- Peterson, Larry R., Professor of History; Department Chair Pb.D., 1978, University of Minnesota
- Pull, Mary E. Lecturer of English M.A., 2003, North Dakota State University
- Query, Joy M., Emeritus Professor of Sociology and Psychology
- Ph.D., 1960, University of Kentucky
- Rathge, Richard W., Professor of Sociology and Agribusiness and Applied Economics; Director of State Data Center *Pb.D., 1981, Michigan State University*
- Richardson, B. Lou, Emerita Professor of Mass Communication M.S., 1966. North Dakota State University
- Richardson, Gerald A., Emeritus Professor of Mass Communication
- M.A., 1967, University of Washington
- Riley, Thomas J., Professor of Anthropology; Dean, College of Arts, Humanities and Social Sciences; Director, Institute for Regional Studies *Pb.D.*, 1973, University of Hawaii
- Russell, R. Talmadge, Emeritus Professor of Theatre Arts Pb.D., 1968, University of Iowa
- Saar, Cynthia L., Lecturer in French M.A., 1980, Middlebury College
- Salting, Donald E., Assistant Professor of English Ph.D., 1998, Indiana University
- Sandland, Julie A., Lecturer in English M.A., 1990, North Dakota State University
- Scott, Maureen T., Lecturer in English M.A., 1989, University of North Dakota
- Sellnow, Deanna D., Associate Professor of Speech Communication
- Pb.D., 1991, University of North Dakota
- Sellnow, Timothy L., Professor of Speech Communication Ph.D., 1987, Wayne State University
- Shaw, Richard M., Associate Professor of English; Director of Center for Writers *Pb.D.*, 1985, Ball State University
- PD.D., 1985, Bau State University
- Sherman, William C., Emeritus Professor of Sociology M.A., 1965, University of North Dakota
- Shumate, Michelle D., Assistant Professor of Communication
- Ph.D., 2003, University of Southern California Slobin, Kathleen, Professor of Sociology; Chair of
- Sociology and Anthropology Department Ph.D., 1991, University of California, San Francisco
- Soria-Dufner, Carmen, Lecturer in Spanish M.A., 1980, University of Northern Iowa
- Sparks, Laurel B., Senior Lecturer in Spanish M.A., 1968, University of South Dakota
- Stickney, Gwen, Assistant Professor of Spanish Ph.D., 2004, Indiana University, Bloomington
- Strandness, Jean, Emeritus Professor of English Ph.D., 1974, Michigan State University
- Strom, Claire, Assistant Professor of History Ph.D., 1998, Iowa State University
- Sublett, Virginia, Associate Professor of Music D.M.A., 1997, University of California, San Diego
- Sullivan, Dale L., Professor of English; Head, Department of English
 - Ph.D., 1988, Rensselaer Polytechnic Institute

- Swan, Glenda M., Assistant Professor of Art Pb.D., 2001, Princeton University
- Swenson, David G., Associate Professor of Art M.F.A., 1992, University of Minnesota
- Taggart, Amy Rupiper, Assistant Professor of English Ph.D., 2002, Texas Christian University
- Temanson, Kaye, Lecturer in English M.A., 2001, North Dakota State University
- Thomas, Kathryn A., Instructor in Library Science; Reference and Documents Librarian *M.A., 1974, University of Denver*
- Thompson, Kevin M., Professor of Criminal Justice; Head of Department of Criminal Justice and Political Science Ph.D., 1986, University of Arizona
- Thrasher, Michael, Assistant Professor of Music D.M.A., 1997, University of North Texas
- Tollefson, Wayne E., Emeritus Professor of Art M.A., 1962, Michigan State University
- Totten, Gary, Assistant Professor of English Ph.D., 1998, Ball State University
- Trautwein, Charlotte G., Emeritus Professor of Music M.S., 1968, University of Illinois
- Trautwein, John W., Emeritus Professor of Music M.M.Ed, 1961, American Conservatory of Music
- Advanced Certificate in Music Education, 1965, University of Illinois
- Trump, Andrew B., Lecturer in English M.A., 1984, South Dakota State University
- Tunstall, William, Lecturer in English M.A., 2001, North Dakota State University
- Ubbelohde, E. James, Emeritus Professor of Speech Communication
- *M.A., 1961, New York University* Varland, Rooth, Lecturer in Theatre Arts
- M.F.A., 1989, Northwestern University
- Ward, Steve A., Emeritus Professor of English M.A., 1964, North Dakota State University
- Weber, Michael J., Associate Professor of Music *A.Mus.D., 1990, University of Arizona*
- Weiler, William J., Professor of Philosophy-Humanities; Academic Dean, Cardinal Muench Seminary Pb.D., 1960, Northwestern University
- Wilson, Jennifer L., Assistant Professor of Emergency Management
- Pb.D., 2000, Florida International University
- Wood, Robert A., Associate Professor of Political Science Pb.D., 1983, University of Missouri-Columbia
- Youngs, George A., Professor of Sociology; Director of Social Science Research Center *Pb.D., 1981, University of Iowa*

College of Business Administration

- Altenburg, Karl, Assistant Professor of Management Information Systems
- *Pb.D., 1999, North Dakota State University* Bahrami, Bahman, Professor of Economics
- Pb.D., 1983, University of Nebraska, Lincoln Bitzen, John, Assistant Professor of Management
- Ph.D., 1997, University of Wisconsin Milwaukee
- Brown, Paul R., C.P.A., Senior Lecturer in Business Administration; MBA Director *M.B.A.*, 1989, North Dakota State University
- Clifton, James W., C.P.A., Senior Lecturer in Accounting M.Acc., 1988, University of North Dakota
- Deitz, Donna K., Assistant Professor of Accounting Pb.D., 1989, University of North Dakota
- Dowdell, Thomas, Assistant Professor of Business Administration
- M.A., 1988, University of Pennsylvania Eisele, C. Frederick, Emeritus Professor of Business
- Administration Pb.D., 1971, University of Iowa
- Elder, John, Associate Professor of Finance Pb.D., 1995, University of Virginia
- Froelich, Karen A., Associate Professor of Management *Pb.D., 1994, University of Minnesota*

- Garrison, Michael, Professor of Business Law J.D., 1979, University of North Dakota
- Glatt, Janice O., C.P.A., Senior Lecturer in Accounting M.B.A., 1985, North Dakota State University
- Harter, Charles, C.P.A., Professor of Accounting; Department Chair
- Ph.D., 1991, University of Nebraska-Lincoln Jacobson, Sarah W., Emeritus Professor of Business Administration
- Ph.D., 1991, University of Massachusetts, Amberst
- Jones, Joseph M., Associate Professor of Marketing Pb.D., 1994, University of Missouri-Columbia
- Jorgenson, Maggie, C.P.A., C.M.A., Lecturer M.Acc., 1980, University of North Dakota
- Jung, Jae Min, Assistant Professor of Marketing M.B.A., 1996, University of North Texas
- Kim, Jang-Chul, Assistant Professor of Finance Pb.D., 2003, The University of Memphis
- Klamm, Bonnie K., Assistant Professor of Accounting Ph.D., 1999, Virginia Commonwealth University
- Knoepfle, Terry W., Associate Professor of Tax Accounting and Business Law
- J.D., 1981, University of North Dakota
- Latimer, Joseph, Instructor in Management Information Systems
- M.B.A., 1988, California Polytechnic State University Leitch, Jay A., Distinguished Professor of Agricultural
- Economics; Dean, College of Business Administration Ph.D., 1981, University of Minnesota
- Macintosh, Gerrard, Professor of Marketing Ph.D., 1992, University of Nebraska-Lincoln
- Ramaya, Krishnan, Assistant Professor of Management *Pb.D.*, 1997, University of Kansas
- Rymph, R. Douglas, Assistant Professor of Management Pb.D., 1999, University of South Carolina
- Schiebelhut, John H., Emeritus Professor of Business Administration
- Ph.D., 1970, University of Oregon
- Shi, Zhengzhong, Assistant Professor of Management Information Systems
- Pb.D., 2002, University of Toledo

Pb.D., 1994, Syracuse University

Pb.D., 1998, University of Kansas

Pb.D., 1994, Purdue University

College of Engineering

Business Administration

and Architecture

Landscape Architecture

Pb.D., 2002, Virginia Tech

Engineering

Transfer Center

Engineering

Engineering

Simmons, Bret, Assistant Professor of Management *Pb.D., 2000, Oklaboma State University* Snyder, Herbert, Associate Professor of Accounting

Stevens, Charles D., Associate Professor of Management

Symerekovsky, Joseph, Assistant Professor of Management

Traub, Rodney D., Associate Professor of Management

Akhatov, Iskander, Associate Professor of Mechanical

Pb.D., 1983, Lomonosov University of Moscow

M.Arch., 1999, Minia University, Egypt

Eng.D., 1982, Texas A&M University

M.S., 1949, University of Denver

Biosystems Engineering

Anderson, Donald A., Associate Professor of Civil

Engineering; Director, Transportation Technology

Anderson, Edwin M., Emeritus Professor of Electrical

Backer, Leslie F., Associate Professor of Agricultural and

Bakken, Stewart E., Emeritus Professor of Mechanical

M.S., 1972, North Dakota State University

M.S., 1972, North Dakota State University

M.S., 1961, North Dakota State University

Aly Ahmed, Bakr, Assistant Professor of Architecture and

Stockman, H. Donald, C.P.A., Emeritus Professor of

M.S.B.A., 1965, University of North Dakota

Pb.D., 2003, Case Western Reserve University
- Bares, William A., Emeritus Professor of Electrical Engineering *Ph.D., 1968, University of Wyoming*Bartlett, James P., Adjunct Assistant Professor of Industrial and Manufacturing Engineering *Ph.D., 1992, North Dakota State University*
- Bibeau, Deb E., Assistant Professor of Aerospace Studies M.S., 1994, Northern Michigan University
- Bilen-Green, Canan, Assistant Professor of Industrial and Manufacturing Engineering
- *Pb.D., 1998, University of Wyoming* Bon, Thomas A., Senior Lecturer in Agricultural and Biosystems Engineering
- M.S., 1980, North Dakota State University
- Booker, Darryl, Assistant Professor of Architecture and Landscape Architecture *M.Arch., 1979, University of Colorado*
- Borgerson, Svenn, Adjunct Professor of Civil Engineering
- *Ph.D.*, 1988, University of Minnesota Collins, Charles C., Emeritus Professor of Electrical
- Engineering M.S., 1957, Montana State College
- Cook, John R., Associate Professor of Industrial and Manufacturing Engineering *Pb.D., 1991, Purdue University*
- Cuffy, Laurian G., Assistant Professor of Military Science B.S., 1990, Kansas State University
- Danescu, Radu, Assistant Professor of Mechanical Engineering
- Pb.D., 1998, Clemson University
- d'Anjou, Philippe, Assistant Professor of Architecture and Landscape Architecture *M.A., 1993, Laval University*
- d'Errico, Thomas R., Emeritus Professor of Civil Engineering M.S., 1953, West Virginia University
- Disrud, Lowell A., Assistant Professor of Agricultural and Biosystems Engineering

M.S., 1969, Kansas State University

- Dougan, Brian, Assistant Professor of Architecture and Landscape Architecture *M.Arch., 1981, Texas A & M*
- Ebeling, Kenneth A., Professor of Industrial and Manufacturing Engineering *Pb.D.*, 1973, Kansas State University
- Elliott, Cecil D., Emeritus Professor of Architecture M.Arcb., 1948, Harvard University
- Elnahas, Mohamed, Assistant Professor of Architecture and Landscape Architecture *M.Arcb.*, 1990, Ain Sbams, Egypt *Pb.D.*, 1996, University of Adelaide
- Ewert, Daniel L., Professor of Electrical and Computer Engineering; Department Chair *Pb.D., 1989, University of North Dakota*
- Farden, David C., Professor of Electrical and Computer Engineering
- Pb.D., 1975, Colorado State University
- Faulkner, Don C., Associate Professor of Architecture and Landscape Architecture *M.Arch., 1975, University of Utab*
- Gleye, Paul, Professor of Architecture and Landscape Architecture; Department Chair Pb.D., 1983, University of California-Los Angeles
- Glower, Jacob, Associate Professor of Electrical and Computer Engineering
- Ph.D., 1988, Obio State University
- Goplen, Sherman P., Associate Professor of Mechanical Engineering
- Pb.D., 1977, Texas A&M University
- Green, Roger, Assistant Professor of Electrical and Computer Engineering *Ph.D., 1998, University of Wyoming*
- Hanson, Angela, Assistant Professor of Architecture and Landscape Architecture
- M.L.A., 2002, Kansas State University
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- Hellevang, Kenneth J., Professor of Agricultural and Biosystems Engineering *Ph.D., 1989, North Dakota State University*
- Helweg, Otto J., Professor of Civil Engineering; Dean, College of Engineering and Architecture *Pb.D.*, 1975, Colorado State University
- Henderson,Allen J., Emeritus Professor of Industrial and Manufacturing Engineering
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- Hofman, Vernon L., Associate Professor of Agricultural and Biosystems Engineering M.S., 1969, North Dakota State University
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- Jenkinson, Harold L., Emeritus Professor of Architecture M.Arch., 1972, University of Illinois
- Jorgenson, James L., Emeritus Professor of Civil Engineering
- Pb.D., 1966, Purdue University
- Jorgenson, Joel A., Assistant Professor of Electrical and Computer Engineering *Pb.D., 1998, Iowa State University*
- Kallmeyer, Alan R., Associate Professor of Mechanical
- Engineering Pb.D., 1995, University of Iowa
- Karami, Ghodratollah, Associate Professor of Mechanical Engineering
- Pb.D., 1984, Imperial College of Science and Technology, University of London
- Katti, Dinesh R., Professor of Civil Engineering; Dept. Chair Ph.D., 1991, University of Arizona
- Katti, Kalpana, Assistant Professor of Civil Engineering Pb.D., 1996, University of Washington
- Katti, Rajendra, Associate Professor of Electrical and Computer Engineering
- *Ph.D., 1991, Washington State University* Kavasseri, Rajesh, Assistant Professor of Electrical and
- Computer Engineering Ph.D., 2002 Washington State University
- Kellogg, Kenneth G., Assistant Professor of Civil Engineering
- Ph.D., 1993, Utah State University
- Kennedy, Thomas (Tim), Assistant Professor of Landscape Architecture
- M.L.A., 1991, Cornell University
- Khaled, Nassar, Assistant Professor of construction Management and Engineering *Pb.D., 1999, Virginia Tech*
- Khan, Eakalak, Assistant Professor of Civil Engineering Pb.D., 1997, University of California, Los Angeles
- Kirschenman, Merlin D., Emeritus Associate Professor of Construction Management and Engineering *M.S., 1976, University of California-Berkeley*
- Krause, Daniel J., Emeritus Professor of Electrical and Computer Engineering
- Ph.D., 1972, Colorado State University
- Kucera, Henry L., Emeritus Professor of Agricultural and Biosystems Engineering M.S., 1959, North Dakota State University
- La Palm, George L., Emeritus Professor of Civil
- Engineering Pb.D., 1968, Purdue University
- Li, Kam, Emeritus Professor of Mechanical Engineering Ph.D., 1965, Oklaboma State University
- Lima, Ivan, Assistant Professor of Electrical and Computer Engineering
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- Lin, Wei, Associate Professor of Civil Engineering Pb.D., 1992, New York State University, Buffalo
- Lindley, James A., Associate Professor of Agricultural and Biosystems Engineering *Pb.D.*, 1972, *Purdue University*

- Longhenry, Robert R., Emeritus Professor of Electrical Engineering
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- Mahalingam, Ganapathy, Assistant Professor of Architecture and Landscape Architecture *Ph.D., 1995, University of Florida*
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Computer Engineering

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- Pfister, Philip C., Emeritus Professor of Mechanical Engineering
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- Pieri, Robert V., Professor of Mechanical Engineering; Ph.D., 1987, Carnegie-Mellon University
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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 *M.S., 1941, Kansas State University*
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- Yadav, Om P., Assistant Professor of Industrial and Manufacturing Engineering
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- Yazdani, Siamak, Professor of Civil Engineering; Ph.D., 1987, University of New Mexico
- Yuvarajan, Subbaraya, Professor of Electrical and Computer Engineering
- Ph.D., 1981, Indian Institute of Technology, Madras, India
- Zhong, Weihong, Associate Professor of Mechanical Engineering
- Ph.D., 1994, Beijing University of Aeronautics and Astronautics, China
- Ziejewski, Mariusz, Associate Professor of Mechanical Engineering
- Pb.D., 1986, North Dakota State University
- Zimmerman, Robert A., Adjunct Professor of Civil Engineering
- Ph.D., 1991, North Dakota State University

College of Human Development and Education

- Aakre, Dean E., Extension Specialist M.Ed., 1998, North Dakota State University
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- Anderson, Sharon D., Emeritus Professor of Human Development and Education
- Ph.D., 1994, University of North Dakota

- Ary, Judith M., Senior Lecturer in Health, Nutrition, and Exercise Sciences
- M.H.E., 1989, Idabo State University
- Bach, Annette S., Emeritus Professor of Extension M.S., 1972, University of Southern California
- Barney, David C., Assistant Professor in 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
- Bartoszuk, Karin, Assistant Professor and Extension Specialist, Child Development and Family Science *Pb.D., 2002, Auburn University*
- Bastow-Shoop, Holly E., Professor of Apparel, Design, Facility, and Hospitality Management; Department Head *Pb.D.*, 1981, Oklaboma State University
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- *M.Ed., 1994, University of Idabo* Beck, Patricia L., Emeritus Professor of Extension
- M.S., 1965, Colorado State University
- Berglund, Patricia, Associate Professor of Health, Nutrition and Exercise Sciences; Director, Northern Crops Institute
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Nutrition, and Exercise Sciences

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Ph.D., 2000, University of Kansas

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M.S., 1998, University of Minnesota

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Science; Department Head

Exercise Sciences

Education

Development

B.S., 1984, North Dakota State University

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Ph.D., 1974, Pennsylvania State University

Ph.D., 1973, Michigan State University

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B.S., 1988, North Dakota State University

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Eidem, Orville M., Jr., Emeritus Professor of Music

M.M.Ed., 1960, Vander Cook College of Music

Pb.D., 1974, Purdue University

Edwards, Jane U., Assistant Professor, Extension Specialist

M.S., 1968, North Dakota State University

Exercise Sciences

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- Ed.D., 1995, University of Minnesota
- Erhardt, Marvin J., Adjunct Assistant Professor of Education *Ed.D., 1994, University of Wyoming*
- Erickson, Martin J., Assistant Professor of Child Development and Family Science *Ph.D., 2004, Iowa State University*
- Fitzgerald, Margaret A., Associate Professor of Child Development and Family Science *Pb.D., 1997, Iowa State University*
- Fragodt, Alvin L., Emeritus Professor of Extension M.S., 1974, North Dakota State University
- Garden-Robinson, Julie A., Extension Specialist and Assistant Professor in Health, Nutrition, and Exercise Sciences *Pb.D.*, 1994, North Dakota State University
- Gregoire, Beulah E, Emeritus Professor of Health.
- Nutrition, and Exercise Sciences M.Ed., 1953, University of Minnesota
- Gress, Nancy M., Director, Student Services and Advancement
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- Gulbrandson, Ruth, Emeritus Professor of Extension M.S., 1973, North Dakota State University
- Habedank, Debra A., Director, Center for Child Development
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- Ed.D., 1978, University of Montana
- Hannon, J. Wade, Associate Professor of Education Ed.D., 1983, University of Arkansas
- Hansen, Pamela J., Assistant Professor in Health, Nutrition and Exercise Sciences
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- Haring, Kara, Instructor, Health, Nutrition and Exercise Sciences
- M.A., 1998, University of Nebraska at Kearney
- Hauser, Fredric J., Emeritus Professor of Extension M.S., 1967, North Dakota State University
- Hirani, Aditi K., Assistant Professor in Apparel, Design, Facility and Hospitality Management M.S., 2003, University of North Carolina - Greensboro
- Holbrook, Sandra, Adjunct Professor of Education Pb.D., 1984, University of Minnesota
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Pb.D., 1987, University of Minnesota

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Ed.D., 1975, University of Utab

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- Johnson, Virginia Clark, Professor of Child Development and Family Science; Dean, College of Human Development and Education *Pb.D., 1984, Pennsylvania State University*
- Kaler, Nancy J., Senior Lecturer in Child Development and Family Science
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- Light, Harriett E., Professor of Child Development and Family Science
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- Martin, William O., Associate Professor of Education and Mathematics; Department Chair Ph.D., 1993, University of Wisconsin-Madison
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- McLeod, Mitchell F., Lecturer in School of Education and Health, Nutrition, and Exercise Sciences *Ph.D.*, 1989, University of New Mexico
- Milakovic, Angela M., Extension Specialist M.S., 2002, North Dakota State University
- Miller, Jo Ann, Professor of Music Education D.M.A., 1989, Conservatory of Music, University of Cincinnati
- Miller-Boschert, DeAnn, Lecturer, School of Education M.S., 1990, North Dakota State University
- Montplaisir, Lisa, Assistant Professor in Biological Sciences and School of Education
- *Ph.D., 2003, University of Arizona* Murphy, Patricia D., Emeritus Professor of Education
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- Nielsen, Robert C., Professor of Education Ed.D., 1973, University of Northern Colorado
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- Overton, Kimberly A., Lecturer in School of Education M.Ed., 2000, North Dakota State University
- Pankow, Debra L., Assistant Professor and Extension Specialist in Child Development and Family Science *Pb.D., 2002, South Dakota State University*
- Pavek, F Leslie, Emeritus Professor of Education Ed.D., 1968, University of North Dakota
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- Rusaw, Carol, Associate Professor in School of Education Ed.D., 1989, Virginia Polytechnic Institute
- Sanders, Gregory E, Professor of Child Development and Family Science; Associate Dean, College of Human Development and Education *Pb.D.*, 1983, University of Georgia
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Center for 4-H Youth Development

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- M.S., 1996, University of North Dakota
- Linson, Larry P., Adjunct Clinical Instructor in Pharmacy Practice
- B.S., 1978, North Dakota State University
- Lundeen, Tina, Assistant Professor in Nursing M.S., 1995, University of Minnesota
- Magarian, Edward O., Emeritus Professor of Pharmacy Practice
- Pb.D., 1964, University of Mississippi
- McCullagh, Marjorie, Associate Professor of Nursing Ph.D. in Nursing, 1999, University of Michigan
- McPherson, Daniel, Adjunct Professor of Pharmacy Practice
- Pharm.D., 1985, University of Nebraska
- McPherson, Debra Johnson, Adjunct Professor of Pharmacy Practice *Pbarm.D., 1985, University of Nebraska*
- Meese, Marty, Adjunct Professor of Pharmacy Practice Pharm.D., 1989, University of Minnesota
- Miller, Donald R., Professor of Pharmacy Practice; Department Chair
- Pharm.D., 1978, University of Michigan Mooney, Mary Margaret, Professor in Nursing; Chair
- D.N.Sc., 1980, Catholic University of America Munoz, Juan M., Adjunct Professor of Pharmacology
- M.D., 1970, National University of San Marcos, Lima, Peru
- Naughton, Cynthia, Assistant Professor of Pharmacy Practice Pharm.D., 1995, North Dakota State University
- Nelson, Brien, Lecturer in Pharmacy Practice
- B.S., 1978, North Dakota State University
- Nelson, Robert E., Lecturer in College of Pharmacy Pharm.D., 1997, North Dakota State University

- Odegaard, Jacqueline J., Adjunct Professor of Pharmacy Practice
- Pharm.D., 1986, University of Minnesota
- Olig, David J., Adjunct Clinical Instructor in Pharmacy Practice
- B.S., 1975, North Dakota State University Omvig, Kenton T., Assistant Professor of Pharmacy Practice
- Pharm.D., 1993, North Dakota State University
- O'Rourke, Stephen T., Associate Professor of Pharmaceutical Sciences Ph.D., 1985, University of Wisconsin
- Ozbun, Judith M., Emeritus Professor of Pharmacy Practice
- M.S., 1962, North Dakota State University
- Patterson, Betty, Assistant Professor of Pharmacy Practice Ph.D., 1968, University of Iowa
- Peterson, Charles D., Professor of Pharmacy Practice; Dean, College of Pharmacy
- *Pharm.D., 1977, University of Minnesota* Pfister, Gregory M., Adjunct Professor of Pharmacy
- Practice Pharm.D., 1991, University of Minnesota
- Quan, Danyi, Adjunct Professor of Pharmaceutical Sciences
- Ph.D., 1981, Hoshi University-Tokyo

Pb.D., 1978, University of Minnesota

B.S., 1977, North Dakota State University

B.S., 1985, North Dakota State University

Pb.D., 1957, University of Illinois

Pb.D., 1969, Purdue University

Sayler, Doreen M., Adjunct Clinical Instructor in

Sciences

Practice

Affairs

Practice

Sciences

Sciences

Sciences

Practice

Practice

Practice

Pharmacy Practice

Pharmacy Practice

Roehrich, Mike, Adjunct Clinical Instructor of Pharmacy Practice B.S., 1978, North Dakota State University

Roerig, James L., Adjunct Professor of Pharmaceutical

Sateren, Lance, Adjunct Clinical Instructor in Pharmacy

Schermeister, Leo J., Emeritus Professor of Pharmacology

Schmitz, Tara, Assistant Professor in Pharmacy Practice

Toxicology; Provost and Vice President for Academic

Schultz, Robert, Adjunct Clinical Instructor in Pharmacy

Scott, David, Associate Professor of Pharmacy Practice

Sharma, Avadesh, Assistant Professor of Pharmaceutical

Shelver, William H., Emeritus Professor of Pharmaceutical

Sheng, Jonathan, Assistant Professor of Pharmaceutical

Singh, Jagdish, Professor of Pharmaceutical Sciences

Strandberg, Kenneth M., Lecturer in Pharmacy Practice

Straus, Laurie A., Adjunct Clinical Instructor in Pharmacy

Strommen, Gordon L., Emeritus Professor of Pharmacy

Sylvester, Robert K., Associate Professor of Pharmacy

Tharaldson, Thomas N., Adjunct Clinical Instructor in

Pb.D., 1982, Banaras Hindu University, India

M.B.A., 1984, North Dakota State University

B.S., 1982, North Dakota State University

Pharm.D., 1984, University of Nebraska

Pharm.D., 1976, University of Minnesota

B.S., 1967, North Dakota State University

Pharm.D., 1995, North Dakota State University

Schnell, R. Craig, Professor of Pharmacology and

B.S., 1987, North Dakota state University

Pb.D., 1987, University of Minnesota

Pb.D., 1992, Panjab University, India

Pb.D., 1962, University of Virginia

Stenson, Jana, Lecturer in Nursing

Pb.D., 1998, State University of New York

M.S., 1995, University of North Dakota

- Thompson, Shila, Assistant Professor in Nursing *M.S.N., 2001, University of Mary*
- Tight, Robert R., Adjunct Professor of Pharmacy M.D., 1967, University of Rochester
- Treitline, Robert, Adjunct Clinical Instructor in Pharmacy Practice
- B.S., 1969, North Dakota State University Vincent, Muriel C., Emeritus Professor of Pharmacy Practice
- Ph.D., 1955, University of Washington

Welch, Justin, Assistant Professor of Pharmacy Practice Pharm.D., 1998, North Dakota State University

Wentz, Melissa, Adjunct Clinical Instructor in Pharmacy Practice

B.S., 1992, North Dakota State University

- Wilhelm, Ross, Assistant Professor in Pharmacy Practice Pharm.D., 1998, North Dakota State University
- Worrel, Jodi, Adjunct Professor of Pharmacy Practice Pharm.D., 1997, North Dakota State University

College of Science and Mathematics

- Andersen, Sandra, Assistant Professor of Computer Science
- Ph.D., 1996, North Dakota State University
- Anderson, Marc D., Assistant Professor of Biological Sciences

Ph.D., 1995, Iowa State University

Anderson, Noel W., Adjunct Professor of Computer Science

Pb.D., 1988, Iowa State University

- Ashworth, Allan C., Distinguished Professor and James A. Meier Professor of Geology *Pb.D., 1969, University of Birmingbam, England*
- Barabanov, Nikita, Associate Professor of Mathematics Pb.D., 1979, Leningrad University, Russia Doctor of Science, 1990, Kiev Institute of Cybernetics
- Bergman, Mary Jo, Adjunct Professor of Biological Sciences

M.Ed., 1994, University of Mary

- Bhandary, Madhusudan, Associate Professor of Statistics Ph.D., 1987, University of Pittsburgh
- Bierwagen, Gordon, Professor Coatings and Polymeric Materials; Department Chair *Pb.D.*, 1968, *Iowa State University*
- Blakeslee, Barbara, Research Professor of Psychology Pb.D., 1983, University of California, Santa Barbara
- Bleier, William J., Distinguished Professor of Biological Sciences; Department Chair
- Ph.D., 1975, Texas Tech University
- Boudjouk, Philip, Distinguished Professor of Chemistry Ph.D., 1971, University of Wisconsin, Madison

Brady, Mark, Assistant Professor of Psychology Ph.D., 1999, University of Minnesota

Brammer, J.D., Emeritus Professor of Zoology Ph.D., 1968, Purdue University

Brennan, Joseph, Associate Professor of Mathematics Pb.D., 1984, University of Illinois

Brophy, John A., Emeritus Professor of Geology Pb.D., 1958, University of Illinois

Brown, Gary L., Adjunct Professor of Respiratory Care B.A., 1977, University of Minnesota, Morris

Buck, Dorryl L., Adjunct Professor of Clinical Laboratory Sciences

M.D., 1970, University of Iowa

- Buckner, James S., Adjunct Professor of Chemistry and Molecular Biology *Pb.D.*, 1971, North Dakota State University
- Buitron, Deborah P., Adjunct Professor of Biological Sciences
- Pb.D., 1982, University of Minnesota
- Burghaus, Uwe, Assistant Professor of Chemistry and Molecular Biology

Ph.D., 1995, Free University Berlin, 1995

- Butler, Malcolm G., Professor of Biological Sciences Ph.D., 1980, University of Michigan
- Carlson, Robert B., Adjunct Professor of Statistics Pb.D., 1965, Michigan State University

- Cashmore, Robert W., Adjunct Professor of Clinical Laboratory Science
- M.D., 1965, University of Minnesota
- Cassel, J. Frank, Emeritus Professor of Zoology Pb.D., 1952, University of Colorado
- Chisholm, Brett, Adjunct Professor of Coatings and Polymeric Materials
- Ph.D., 1993, University of Southern Mississippi Clambey, Gary K., Associate Professor of Biological
- Sciences
- Ph.D., 1975, Iowa State University
- Clark, Mark E., Assistant Professor of Biological Sciences Ph.D., 1996, University of Tennessee
- Coffey, James H., Adjunct Professor of Biological Sciences M.D., 1953, University of Nebraska
- Collier, Sharon K., Adjunct Professor of Biological Sciences
- B.S., 1965, Morningside College
- Comez, Dogan, Professor of Mathematics Pb.D., 1983, University of Toronto, Canada
- Cook, Gregory, Associate Professor of Chemistry and Molecular Biology *Pb.D.*, 1993, *Michigan State University*
- Coonce, Harry B., Adjunct Professor of Mathematics Pb.D., 1969, University of Delaware
- Cope, Davis, Associate Professor of Mathematics Pb.D., 1980, Vanderbilt University
- Council, James R., Professor of Psychology; Department
- Chair Ph.D., 1984, University of Connecticut
- Coykendall, James, Associate Professor of Mathematics Pb.D., 1995, Cornell University
- Croll, Stuart G., Professor of Coatings and Polymeric Materials; Adjunct Professor of Physics *Pb.D.*, 1974, University of Leeds, U.K.
- Crosby, Ross D., Adjunct Professor of Psychology Pb.D., 1989, University of Nevada, Reno
- Davis, David G., Adjunct Professor of Biological Sciences Pb.D., 1965, Washington State University
- Degges, Ronald C., Lecturer in Statistics M.S., 1995, North Dakota State University
- Denton, Alan R., Assistant Professor of Physics Pb.D., 1991, Cornell University
- Denton, Anne, Assistant Professor of Computer Science
- *Ph.D., 1996, University of Mainz, Germany* Dhanwada,Vijaya,Adjunct Professor of Biological
- Sciences M.D., 1969, Guntur Medical College, India
- Dorsam, Glenn, Assistant Professor of Chemistry and
- Molecular Biology Pb.D., 1998, Virginia Commonwealth University
- Du, Xiaojiang (James), Assistant Professor of Computer Science and Operations Research
- Ph.D., 2003, University of Maryland, College Park
- Duysen, Murray E., Emeritus Professor of Botany/Biology Pb.D., 1966, University of Nebraska
- Erfanian, Nasrin, Adjunct Professor of Psychology Ph.D., 1995, University of North Dakota
- Erickson, D. Bruce, Associate Professor of Computer Science
- Pb.D., 1973, Yale University
- Esslinger, Theodore L., Professor of Biological Sciences Pb.D., 1974, Duke University
- Euliss, Ned, Adjunct Professor of Biological Sciences Pb.D., 1989, Oregon State University
- Fawley, Marvin W., Professor of Biological Sciences Ph.D., 1985, Miami University
- Fischer, Allan G., Emeritus Dean and Emeritus Professor of Biochemistry and Molecular Biology *Pb.D.*, 1966, Indiana University
- Frank, Albert B., Adjunct Professor of Botany/Biology Ph.D., 1969, North Dakota State University
- Friese, Charles R., Emeritus Professor of Mathematics M.S., 1958, North Dakota State University
- Friesen, Chris, Assistant Professor of Psychology Ph.D., 2001, University of Alberta

- Fu, Huirong, Assistant Professor of Computer Science Ph.D., 2000, Nanyang Technological University, Singapore
- Galitz, Donald S., Emeritus Professor of Botany/Biology Ph.D., 1961, University of Illinois
- Gammill, Robert C., Emeritus Professor of Computer Science
- Ph.D., 1969, Massachusetts Institute of Technology Garvey, Roy G., Associate Professor of Chemistry and
- Molecular Biology Ph.D., 1966, University of Utab
- Fb.D., 1900, University of Utab
- Gelling, Victoria Johnston, Research Professor of Coatings and Polymeric Materials *Pb.D., 2001, North Dakota State University*
- Gerst, Jeffery W., Professor of Biological Sciences Pb.D., 1973, University of Nebraska
- Gillispie, Gregory D., Professor of Chemistry and Molecular Biology
- Pb.D., 1975, Micbigan State University Glass, J. Edward, Adjunct Professor of Polymers and Coatines
 - Ph.D., 1964, Purdue University
- Gordon, Robert, Assistant Professor of Psychology Ph.D., 1999, University of Illinois at Urbana -Champaign
- Gordon, Wendy, Assistant Professor Psychology Ph.D., 2002, University of Illinois at Urbana -Champaign
- Grier, James W., Distinguished Professor of Biological Sciences
- Pb.D., 1975, Cornell University

Molecular Biology

Chair

Materials

Sciences

Molecular Biology

Molecular Biology

Hakk, Heldur, Adjunct Professor of Chemistry and Molecular Biology

Hammond, James J., Adjunct Professor of Statistics

Hammond, Richard, Adjunct Professor of Physics

Pb.D., 1979, Rennselaer Polytechnic Institute

Pb.D., 1990, North Dakota State University

M.S., 1962, Illinois Institute of Technology

Hatzenbuhler, Elaine C., Lecturer in Geology

M.A., 1972, University of Illinois

B.S., 1971. Kansas State University

Pb.D., 1986. Yale University

Hass, Lonnie D., Senior Lecturer in Mathematics

Ph.D., 1969, University of Nebraska

Hamilton, David H., Assistant Professor of Chemistry and

Pb.D., 1999, University of Illinois, Urbana/Champaign

Hanson, Mark A., Adjunct Professor of Biological Sciences

Herbek, Gene N., Adjunct Professor of Biological Sciences

Hershberger, John F., Professor of Chemistry; Department

M.D., 1975, University of Nebraska Medical Center

Hill, Loren, Adjunct Professor of Polymers and Coatings

Huo, Qun, Assistant Professor of Coatings and Polymeric

Hutchison, Ronald S., Assistant Professor of Biological

Pb.D., 1994, University of Illinois, Urbana/Champaign

Jacobson, Denley B., Associate Professor of Chemistry and

Jaseja, Mahesh, Assistant Professor of Chemistry and

Pb.D., 1987, University of New Brunswick, Canada

Johnson, Dana L., Senior Lecturer in Computer Science

Ph.D., 1965, Pennsylvania State University

Huang, Chunfeng, Assistant Professor of Statistics

Hinsz, Verlin B., Professor of Psychology Pb.D., 1983, University of Illinois

Ph.D., 2001, Texas A&M University

Ph.D., 1999, University of Miami

Ihle, Thomas, Assistant Professor of Physics

Pb.D., 1996, Tech. University of Aachen

Pb.D., 1984, Purdue University

M.S., 1980, University of Denver

Haring, Ferdinand, Emeritus Professor of Mathematics

Ph.D., 1997, North Dakota State University

- Johnson, Douglas H., Adjunct Professor of Statistics Ph.D., 1986, North Dakota State University
- Johnson, Ivan M., Adjunct Professor of Biological Sciences Pb.D., 1969, University of Montana
- Johnson, Kenneth R., Emeritus Professor of Mathematics Pb.D., 1980, University of Colorado
- Juell, Paul L., Associate Professor of Computer Science Ph.D., 1981. Obio State University
- Juras, Martin, Assistant Professor of Mathematics Pb.D., 1997, Utab State University
- Kamel, Ahmed, Assistant Professor of Computer Science Pb.D., 1994, Michigan State University
- Killilea, S. Derek, Professor of Chemistry and Molecular Biology:
- Ph.D., 1972, National University of Ireland, Galway, Ireland
- Klosterman, Harold J., Emeritus Professor Biochemistry and Molecular Biology
- Ph.D., 1955, University of Minnesota
- Kornfeld, Isaac, Professor of Mathematics Pb.D., 1975, Tashkent State University, Uzbekistan
- Kroll, Daniel, Professor of Physics, Department Head Pb.D., 1973, University of Chicago
- Langley, Linda, Assistant Professor of Psychology Pb.D., 1998, University of Minnesota
- Larsen, Gerald L., Adjunct Professor of Chemistry and Molecular Biology
- Pb.D., 1980, North Dakota State University Leopold, Roger A., Adjunct Professor of Biological
- Sciences Pb.D., 1967, Montana State University
- Lepper, Kenneth, Assistant Professor of Geosciences Pb.D., 2004, Oklaboma State University
- Li, Honglin, Assistant Professor of Computer Science Pb.D., 2004, Obio State University
- Linz, George M., Adjunct Professor of Biological Sciences Pb.D., 1981, North Dakota State University
- Lukat-Rodgers, Gudrun, Assistant Professor of Chemistry and Molecular Biology

Pb.D., 1985, Iowa State University

- Magel, Kenneth I., Professor of Computer Science Pb.D., 1977, Brown University
- Magel, Rhonda, Professor of Statistics; Department Chair Pb.D., 1982, University of Missouri-Rolla
- Mallik, Sanku, Associate Professor of Chemistry and Molecular Biology Pb.D., 1991, Case Western Reserve University
- Marsh, Julie A., Adjunct Professor of Biological Sciences
- M.D., 1994, University of North Dakota Marsden, Richard J., Adjunct Professor of Biological Sciences

M.S., 1974, Texas Tech University

Martin, John C., III, Associate Professor of Computer Science

Pb.D., 1971, Rice University

- Martin, William O., Associate Professor of Mathematics Ph.D., 1993, University of Wisconsin-Madison
- Mathsen, Ronald M., Emeritus Professor of Mathematics Pb.D., 1965, University of Nebraska
- Matthey, Sandra G., Adjunct Professor of Biological Sciences
- M.S., 1983, University of North Dakota
- May, Sylvio, Assistant Professor of Physics Pb.D., 1996, Friedrich Schiller University
- McCarthy, Gregory J., Distinguished Professor of Chemistry and Molecular Biology, Adjunct Professor of Geosciences
- Ph.D., 1969, Pennsylvania State University McCaul, Kevin D., Dale Hogoboom Professor of
- Psychology Pb.D., 1978, University of Kansas
- McCourt, Mark, James A. Meier Professor of Psychology Pb.D., 1982, University of California, Santa Barbara
- Meidinger, Alfred, Adjunct Professor of Physics Pb.D., 2000, North Dakota State University

- Meinhardt, Steven, Associate Professor of Chemistry and Molecular Biology
- Pb.D., 1984, University of Illinois, Urbana-Champaign
- Merrick, Thomas A., Adjunct Professor of Biological Sciences M.D., 1966, University of Nebraska
- Miltenberger, Raymond G., Distinguished Professor of
- Psychology Pb.D., 1985, Western Michigan University
- Mitchell, James E., Adjunct Professor of Psychology M.D., 1972, Northwestern University
- Montplaisir, Lisa M., Assistant Professor of Biological Sciences
- Pb.D., 2003, University of Arizona
- Morris, Melvin L., Emeritus Professor of Chemistry Ph.D., 1958. Ohio State University
- Munski, Douglas, Adjunct Professor of Geosciences Ph.D., 1978, University of Illinois at Urbana -Champaign
- Myers, Karen M., Adjunct Professor of Biological Sciences M.A., 1995, University of Colorado
- Nawrot, Mark, James A. Meier Associate Professor of Psychology
- Pb.D., 1991, Vanderbilt University
- Nelson, Carolyn C., Emeritus Senior Lecturer in Mathematics M.S., 1960, North Dakota State University
- Nelson, Gilbert W., Emeritus Professor of Mathematics M.S., 1958, North Dakota State University
- Nickell, Gary S., Adjunct Professor of Psychology Pb.D., 1982, Oklaboma State University
- Nuechterlein, Gary L., Professor of Biological Sciences Pb.D., 1980, University of Minnesota
- Nygard, Kendall E., Professor of Computer Science; Department Chair
- Pb.D., 1978, Virginia Polytechnic Institute and State University
- Oleson, Arland E., Emeritus Professor of Biochemistry and Molecular Biology
- Ph.D., 1963, University of Minnesota
- Olsen, James H., Professor of Mathematics Ph.D., 1968, University of Minnesota
- Olson, Lloyd D., Emeritus Professor of Mathematics M.Ed., 1954, North Dakota State University
- Olson, Polly M., Lecturer in Clinical Laboratory Radiologic Science and Respiratory Care; Director M.S., 1993, University of North Dakota
- O'Neill, George P., Adjunct Professor of Psychology Pb.D., 1974, Georgia State University
- O'Neill, H.K., Assistant Professor of Psychology Ph.D., 1991, University of North Dakota
- Oswald, Gregory A., Lecturer in Chemistry and Molecular Biology
- M.S., 1996, North Dakota State University
- Page, Michael, Associate Professor of Chemistry and Molecular Biology
- Pb.D., 1982, State University of New York, Buffalo Park, Ernest, Adjunct Professor of Psychology
- Ph.D., 2003, Michigan State University Pavicic, Mark J., Adjunct Professor of Computer Science Ph.D., 1985, Columbia University
- Perrizo, William K., Jordan Engberg Professor of **Computer Science**
- Ph.D., 1972, University of Minnesota
- Peterka, John J., Emeritus Professor of Zoology Ph.D., 1964, University of Minnesota Provder, Theodore, Adjunct Professor of Polymers and
- Coatings
- Pb.D., 1965, University of Wisconsin
- Puvear, Robert L., Emeritus Professor of Zoology Pb.D., 1964, Oregon State University
- Qalbani, Askar, Adjunct Professor of Biological Sciences M.D., 1970, Liaquat Medical College, Pakistan
- Rao, M. Bhaskara, Emeritus Professor of Statistics, Adjunct Professor of Mathematics Pb.D., 1973, Indian Statistical Institute, India

- Rasmussen, Seth C., Assistant Professor of Chemistry and Molecular Biology
- Pb.D., 1994, Clemson University, South Carolina
- Reed, Wendy, Assistant Professor of Biological Sciences Pb.D., 2000, Iowa State University
- Reiser, Mary, Adjunct Professor of Biological Sciences Ph.D., 1988, Arizona State University
- Richardson, LL, Adjunct Professor of Geosciences Pb.D., 1974. Iowa State University
- Robinson, Michael D., Assistant Professor of Psychology Pb.D., 1996, University of California, Davis
- Rodgers, Kenton R., Associate Professor of Chemistry and Molecular Biology
- Ph.D., 1988, University of Iowa
- Roesler, Adjunct Professor of Coatings and Polymeric Materials
- Pb.D., 1969, University of Washington
- Rokke, Paul D., Professor of Psychology Pb.D., 1985, University of Houston
- Rudesill, James T., Emeritus Professor of Chemistry Pb.D., 1957, Purdue University
- Saini-Eidukat, Bernhardt, Associate Professor of Geology; Department Chair
- Pb.D., 1991, University of Minnesota
- Salah, Akram, Associate Professor of Computer Science Pb.D., 1986, University of Alabama, Birmingham
- Sawicki, Charles A., Associate Professor of Physics Pb.D., 1975, Cornell University
- Schwert, Donald P., Professor of Geology; Director, Center for Science, Mathematics, Engineering and Technology Education
- Ph.D., 1978, University of Waterloo, Canada

University

Sciences

Chair

Science

Biology

Sciences

Molecular Biology

Molecular Biology

Scoby, Donald R., Emeritus Professor of Botany/Biology Ph.D., 1968, North Dakota State University Shappell, Nancy, Adjunct Professor of Biological Sciences

Pb.D., 1988, Virginia Polytechnic Institute and State

Sheridan, Mark A., James A. Meier Professor of Biological

Shreve, Warren E., Professor of Mathematics; Department

Sibi, Mukund P., Jordan Engberg Professor of Chemistry

Sime, Stacy L., Adjunct Professor of Biological Sciences

Skerry, Brian, Adjunct Professor of Polymers and Coatings

Skogen, Madeleine K., Emeritus Professor of Mathematics

Smith, Mary K., Adjunct Professor of Biological Sciences

Sojka, Nadine M., Adjunct Professor of Clinical Laboratory

M.S., 1996, California College of Health Sciences

Sparks, Robert B., Associate Professor of Chemistry and

Srivastava, D.K., Professor of Chemistry and Molecular

Pb.D., 2002, University of California at Santa Barbara

Stewart, Mary J., Assistant Professor of Biological Sciences

Stockwell, Craig A., Associate Professor of Biological

Ph.D., 1980, Banaras Hindu University, India

Staley, Karen, Assistant Professor of Mathematics

Pb.D., 1992, Kansas State University

Ph.D., 1995, University of Nevada, Reno

Pb.D., 1968, Kansas State University

Stolzenberg, Gary E., Lecturer in Chemistry and

Sinha, Mahendra K., Emeritus Professor of Physics

Pb.D., 1961, Pennsylvania State University

Ph.D., 1980, University of Manchester, U.K.

M.S., 1960, North Dakota State University

Slanger, William D., Adjunct Professor of Statistics;

Slator, Brian M., Professor of Computer Science

Pb.D., 1988, New Mexico State University

M.S., 1996, University of South Dakota

Ph.D., 1972, University of South Dakota

Ph.D., 1985, University of California, Berkeley

Pb.D., 1967, University of Nebraska

M.S., 1997, Drake University

Pb.D., 1975, Cornell University

Ph.D., 1980, City University of New York

- Stoy, Patrick, Adjunct Professor of Respiratory Care M.D., 1974, University of Minnesota
- Sugihara, James M., Emeritus Professor of Chemistry Ph.D., 1947, University of Utah
- Sun, Wenfang, Assistant Professor of Chemistry and Molecular Biology
- Ph.D., 1995, Institute of Photographic Chemistry, Chinese Academy of Science
- Suttle, Jeffrey C., Adjunct Professor of Botany/Biology Ph.D., 1979, Michigan State University
- Swenson, Orven F., Associate Professor of Physics Ph.D., 1982, Air Force Institute of Technology
- Taylor, Larry D., Senior Lecturer in Mathematics M.S., 1997, North Dakota State University
- Tallman, Dennis E., Professor of Chemistry and Molecular Biology

Pb.D., 1968, Obio State University

- Terpstra, Jeffrey T., Associate Professor of Statistics Ph.D., 1997, Western Michigan University
- Tucker, Robert, Adjunct Professor of Chemistry Pb.D., 1967, Iowa State University
- Ubhaya, Vasant A., Professor of Computer Science Ph.D., 1971, University of California, Berkeley
- Ungar, Abraham A., Professor of Mathematics Ph.D., 1973, Tel Aviv University, Israel
- Van Amburg, Gerald L., Adjunct Professor of Biological Sciences
- Ph.D., 1969, Texas A&M University
- Vick, Brady A., Adjunct Professor of Chemistry and Molecular Biology
- Pb.D., 1975, North Dakota State University
- Vinograd, Robert E., Emeritus Professor of Mathematics Pb.D., 1952, Moscow State University D.Sc., 1960, Moscow State University, Russia
- Vreugdenhill, Andrew, Adjunct Professor of Coatings and Polymeric Materials
- Ph.D., 1996, McGill University
- Wagner, Alexander, Assistant Professor of Physics Ph.D., 1997, Oxford University
- Webster, Dean C., Professor of Coatings and Polymeric Materials Ph.D., 1984, Virginia Polytechnic Institute and State
- University
- Wettstein, Greg, Adjunct Professor of Computer Science Pb.D., 1988, North Dakota State University
- White, Alan R., Professor of Biological Sciences; Dean, College of Science and Mathematics *Pb.D., 1981, University of North Carolina*
- Wicks, Zeno W., Jr., Emeritus Professor of Polymers and Coatings

Ph.D., 1944, University of Illinois

- Withnell, Gary D., Adjunct Professor of Physics Ph.D., 1980, North Dakota State University
- Wittrock, David A., Professor of Psychology Pb.D., 1990, State University of New York, Albany
- Wonderlich, Stephen A., Adjunct Professor of Psychology Pb.D., 1985, University of Missouri
- Xu, Dianxiang, Assistant Professor of Computer Science Ph.D., 1995, Nanjing University, China
- Zhang, Zhiwei, Assistant Professor of Statistics Ph.D., 2003, University of Pittsburgh

S8	1	Agricultural and Biosystems Engineering
S5	2	Agronomy Greenhouse Plant Diagnostic Lab
R11	3	Alba Bales House (Family Studies Institute)
512 I1	4 5	Animal Nutrition and Physiology Center/Occupational Safety
<i>j</i> -	-	and Environmental Health
P9	6	Architecture and Landscape Architecture
09	7	Architecture Quonset
117	9	Art (see NDSU Downtown) Askanase Hall (Little Country Theatre)
U4	10	Auxiliary Enterprises (Dining Services, Residence Life)
O11	11	Bentson/Bunker Fieldhouse (HNES, Athletics, ROTC)
G7	12	Biosciences Research Laboratory
G11	13	Bison Sports Arena (HNES, Athletics, Sports Information, Campus Recreation/Intramural)
16 S11	14 15	Campus Laundry Ceres Hall—(Admission, Financial Services, Counseling and
	- ,	Disability Services, Career Center, Registration and Records,
		Cooperative Education, International Programs, Office of Orientation and Student Success, TRIO Programs, Multicultural
		Student Services)
09	16	Civil and Industrial Engineering
09 V0	17	Construction Management
V9 V5	18	Criminal Justice and Public Policy (1616-12th Ave. N.)
V 5 G 9	20	Dacotah Field
09	21	Dolve Hall (Mechanical Engineering)
R8	22	Dunbar Laboratories (Chemistry)
Q10	23	E. Morrow Lebedeff Hall (Human Development and Education)
P10	24	Ehly Hall (Architecture and Landscape Architecture)
P8	25	Electrical and Computer Engineering
P9	26	Engineering Center
Q8	27	Engineering and Technology
09	28	Katherine Kilbourne Burgum Family Life.
<i>v</i>		4-H Center (Education)
S6	29	Harris Hall (Cereal Science)
Q6	30	Hastings Hall (Herbarium)
1/ T5	31	Heating Plant
1) R7	33	Hultz Hall (Animal and Range Sciences Entomology)
Q7	34	Industrial Agriculture and Communications Center
		(Information Technology Services, Computer Network, Computer Science, Industrial Agriculture, Upper Great
02	35	Inhansen Hall (State Seed Dept – Seed Research)
R8	36	Ladd Hall (Chemistry)
U9	37	Library
N2	38	Living Learning Center
07	39	Loftsgard Hall (Biochemistry, Plant Sciences)
Q5	40	Longwell Building
35 R13	2 /1	Lord and Burnham Greenhouses
R5	42	Maintenance Buildings
R9	43	Memorial Union (Varsity Mart)
S10	SU	Metered Parking Lot
T7	44	Minard Hall (Arts, Humanities and Social Sciences)
S7	45	Morrill Hall (Agricultural Administration, Agribusiness and
		Publishing Center)
U6	46	Music Education Building (Festival Concert Hall)
	<i>.</i>	NDSU Downtown (650 NP Avenue)
S10	47	C.I. Nelson Building
50 R2	48 40	Northern Crops Science Lab (cupflowers, succe bases)
V9	18	Northland Educators Federal Credit Union
T10	50	Old Main (Administration, Business Office, Student Affairs, University Relations)
E3	51	Phoenix International
S5	2	Plant Sciences Greenhouse
S2	52	Plant Sciences Greenhouse
T13	53	Post Office
14 U12	54 55	Protato Research-Pesticide Storage
U10	56	Putnam Hall (Business)
U6	46	Reineke Fine Arts Center (Music)
E4	57	Research I
D4	58	Research II
M8	59	Residence Dining Center
E3	60	Research and Technology Park
04 N4	61 62	KODINSON Hall (Veterinary Kesearch)
07	63	Shepperd Arena
A11	64	Skills and Technology Training Center
Т9	65	South Engineering (Physics)
P6	66	Stevens Auditorium
P6	67	Stevens Hall (Natural Sciences)
V12	68	St. Paul's Chapel (Newman Center)

N8 69 Sudro Hall (Pharmacy, Nursing)

Campus Map NORTH DAKOTA STATE UNIVERSITY



70 Sugar Beet Research

- 71 Thordarson Hall (Independent Study,
- State Film Library)
- R6 72 Thorson Maintenance Center (Facilities
 - Management, Campus Police)
- United Campus Ministry, YMCA of NDSU T14 73
 - 74 Van Es (Vet Science, Microbiology)
 - Waldron Laboratory (Agriculture, Soil Testing Lab, Statistics) 75
 - Walster Hall (Agriculture)
- N7 76 P2
 - Wellness Center 77
- L6 78 West Dining Center
- Wiidakas Lab (Plant Sciences, Corn Seed House) 06 79

HOUSING UNITS

V7

P4

06

U10	81	Burgum Hall
Q11	82	Churchill Hall

- S10 83 Dinan Hall
- N2 38 Living Learning Center
- M6 84 Pavek Hall
- L8 85 Reed-Johnson Halls L6
 - 86 Seim Hall

- Sevrinson Hall 87
- N11 88 Stockbridge Hall
- M7 Thompson Hall 89
- University Village E14 90
- M9 91 Weible Halls (North and South)

SELECTED OFFICES

S11	15	Admission (Ceres Hall)
T10	50	Business Office (Old Main)
R6	72	Campus Police (Thorson Maintenance Center)
S11	15	Career Center (Ceres Hall)
S11	15	Counseling and Disability Services (Ceres Hall)
U4	10	Dining Services (Auxiliary Enterprises)
T10	50	Human Resources (Old Main)
S11	15	Registration and Records (Ceres Hall)
U4	10	Residence Life (Auxiliary Enterprises)
T10	50	Student Affairs (Old Main)
S11	15	Student Financial Services (Ceres Hall)
R9	43	Varsity Mart (Memorial Union)

NDSU

North Dakota State University Box 5196 Fargo, North Dakota 58105-5196

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NDSU Academic Calendar 2004-2006

Refer to the term registration schedule, the dates and deadlines pocket calendar or the Web for specific registration and financial dates and deadlines.

Fall 2004 Semester (051)

Registration	August 23	Μ
Classes Begin	August 24	Т
Labor Day Holiday	September 6	Μ
Veterans' Day Holiday	November 11	R
Thanksgiving Recess	November 25-26	R-F
Final Classes/Exams	December 13-17	M-F
Commencement	December 17	F

Spring 2005 Semester (053)

Registration	January 10	Μ
Classes Begin, 4 p.m.	January 10	Μ
M.L. King Jr. Holiday	January 17	Μ
Presidents' Day Holiday	February 21	Μ
Spring Break	March 14-18	M-F
Holiday/Recess	March 25-28	F-M
Final Classes/Exams	May 9-13	M-F
Commencement	May 13	F

Summer 2005 Semester (054)

Siunuuru 4-week Courses		
Registration	May 16	Μ
Classes Begin	May 17	Т
Memorial Day Holiday	May 30	Μ
Classes End	June 10	F
Standard 8-Week Session		
Registration	June 13	Μ
Classes Begin	June 14	Т
Independence Day Holiday	July 4	Μ
Classes End	August 5	F

Fall 2005 Semester (061)

Registration	August 22	Μ
Classes Begin, 4 p.m.	August 22	Μ
Labor Day Holiday	September 5	Μ
Veterans' Day Holiday	November 11	F
Thanksgiving Recess	November 24-25	R-F
Final Classes/Exams	December 12-16	M-F
Commencement	December 16	F

Spring 2006 Semester (063)

Registration	January 9	Μ
Classes Begin, 4 p.m.	January 9	Μ
M.L. King Jr. Holiday	January 16	Μ
Presidents' Day Holiday	February 20	Μ
Spring Break	March 13-17	M-F
Holiday/Recess	April 14-17	F-M
Final Classes/Exams	May 8-12	M-F
Commencement	May 12	F

Summer 2006 Semester (064)

Sianaara 4-week Courses		
Registration	May 15	Μ
Classes Begin	May 16	Т
Memorial Day Holiday	May 29	Μ
Classes End	June 9	F
Standard 8-Week Session		
Registration	June 12	Μ
Classes Begin	June 13	Т
Independence Day Holiday	July 4	Т
Classes End	August 4	F